JULY, 1954

Traffic Engineering

N. J. Turnpike near Laurel Hill, in Hudson County, with New York skyline in background

- **The Engineer's Relation to Highway Transportation**
- **Development & Needs of Virginia Highways**
- **Report of June Meeting**

Official Publication of the Institute of Traffic Engineers

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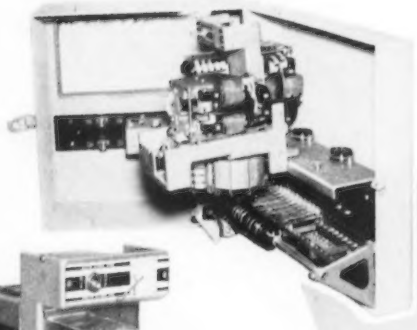

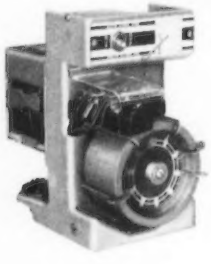

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Traffic Engineering

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COVER: This photograph of the Manhattan skyline was taken from the bridge carrying the famed New Jersey Turnpike over the Passaic and Hackensack rivers. This bridge is not only the longest structure on highway, but is by all means the most complicated as well. In addition to a number of curves including a slight reverse, the structure's grade line continually rolls to pass over or under other structures and transportation routes.

DEFINITION: Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

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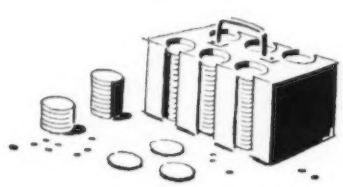

Frankly Speaking

THAT PRESIDENT EISENHOWER recently used seven pens to sign the Federal-Aid Highway Act of 1954 should not be as interesting to traffic engineers as the fact that the public demanded more money for better roads—*and got it!* It is the most federal aid to highways in our history and means an expenditure of $966,000,000 a year.

The passing of this bill was not the work of our "swami friend" in Buffalo. It was done through public opinion, which has been storing up a blast of resentment against a nation that made great strides in the automobile world but refused to build the type of roads that are necessary for today's traffic. It has taken quite some time for the public to reach the boiling point, but now that the citizens are aroused, they will be difficult to stop.

The Federal-Aid Highway Act can be taken as a warning bell—signalling a movement for bigger, better and safer highways. Whether many of these will be toll facilities, free expressways, or bond financed roads, makes little difference. The truth is that better facilities are coming, regardless of cost. As a nation, we already have 10,000 miles of toll roads just around the corner. The construction of these modern roadways frees funds for other important road building. To this can be added the millions of highway dollars sent to states and cities as a result of increased vehicle registrations. With 80,000,000 vehicles predicted for 1975, can anyone deny the traffic problems that will soon face — if they have not already faced—most of the large cities in our country?

Whether Mr. Average Citizen is disappointed with transit facilities, the economic status of our country, or the convenience of mass transportation—the point to keep in mind is that the public has taken to the road. Any effort to change this way of travel will be very difficult indeed.

What does this mean to Traffic Engineers? It means a great future for a relatively young profession. So long as vehicle registrations are on the increase, traffic problems exist. The challenge of the traffic engineer is a very healthy one. Already cities are employing consultants to handle special problems. Many others are finding tremendous benefits in establishing traffic engineering departments. They are getting results from our profession and like them! The public is tired of traffic congestion and wants it eliminated.

We stand at the threshold of a great future for the traffic engineering profession. To be equal to it, all of us must keep abreast of this ever-expanding field. Let's guard our profession zealously, hold our standards high, become actively interested in its affairs both locally and nationally, encourage universities to establish traffic engineering courses, and, above all, use our talents to their greatest ability.

Matthew Sielski

Director
District Number 4

The Engineer's Relation to Highway Transportation

Thomas H. MacDonald, (Honorary Member, ITE)
Texas Transportation Institute, Texas A and M College System
College Station, Texas

The Sixth Salzberg Memorial Lecture, Presented at Syracuse University, April 28, 1954

The Background of Highway Engineering in the United States

THIS DISCUSSION LOGICALLY OPENS with a review of the nature of highway transportation in its relation to the changing circumstances and their consequences in its development which have resulted in our current concepts of the fields of service for highway engineering, and thus broadly defines the professional usefulness of the highway engineer. These causes have moulded the general form of his professional activities, but have not curtailed their scope by empirical limitation. His expanding theoretical science has enabled him to exert a very substantial influence in the shaping of highway transportation into its present pattern. His opportunities in the future will be even greater but will require constantly advancing scientific qualifications.

The profession of highway engineering in the United States had to wait 300 years for the opportunity to develop. To understand such long delay it is necessary first to understand that historically the facilities such as the railways, highways and runways over which the different types of transport operate have never been provided superior to, or in advance of, the current minimum standards required by each particular type. Thus so long as horses were used for highway transportation the surveyor and skilled artisan together with

The Salzberg Memorial Lecture

The Salzberg Memorial Lecture was established in 1949 under a grant made to Syracuse University by Mr. Murray M. Salzberg, a graduate of the College of Business Administration, Class of 1937. The Salzberg Fund is a memorial to Mr. H. E. Salzberg, father of the donor. It is administered in the interest of education in Transportation-Engineering by the Deans of the College of Business Administration and the College of Engineering.

Five Lectures have been presented thus far:

1949 "Head-End Horsepower"
by L. K. Sillcox, Vice Chairman
of the Board, New York Air Brake Company

1950 "Our Government Air Regulatory Policy"
by C. R. Smith, President,
American Airlines

1951 "The United States Steamship Operator Today"
by R. C. Colton, Vice-President,
Lykes Brothers Company, Inc.

1952 "Some Patterns and Issues of Highway Transportation"
by Harmer E. Davis, Director,
Institute of Transportation and
Traffic Engineering,
University of California

1953 "Transportation Problems—Old and New,
A General View"
by Clyde B. Aitchison, Formerly Commissioner.
Interstate Commerce Commission

FRONTISPIECE:

So long as man continues to insist upon working and living in less space than that needed to store his car—as this picture of downtown Manhattan so vividly portrays—the Urban Arterial Road Problem discussed by Mr. MacDonald as part of this paper will remain unsolved. The Port of New York Authority's Union Bus Terminal at 41st Street with its rooftop parking and access ramps to the Lincoln Tunnel plaza is at left center. Tall building is the Empire State.

Courtesy of Standard Oil Company

Photo by Courtesy Bureau of Public Roads

Fig. 1
1632 — First Highway Law.

contractors, who acquired some competence through experience, were able to produce the low standard of roads that could be made to serve and there were few notable exceptions.

It becomes convincingly apparent by reviewing the development of transportation in this nation that a major change in operating characteristics resulting in the expansion of the utility and the performance capacities of each type of powered transport quickly renders obsolete existing facilities and exerts compelling pressures for the provision of new and more adequate facilities.

There is an opportunity in this paper to emphasize two subjects which must be given high priority if desirable degrees of stability are to be achieved in transportation economy and utility and which must be accepted by the highway engineer as professional responsibilities. These two subjects of unlimited application to all elements of transportation are first, *the correlation or synthesis of the "community of interests", and second greatly broadened and extended research.* Such an approach has the further advantage of making more use of the effective, in fact, the essential resources for progress toward these objectives which the universities and colleges command. Reliance upon methods of this character involve a longer period than we accept willingly. Nevertheless, there are sound reasons for faith that the means are thus within reach which if patiently and intelligently used, will provide progressively more acceptable transportation conditions.

Even a superficial examination of the illuminating chart that transportation has traced in the past points to the first caution that there are no simple or easy solutions since transportation presents a series of complex problems of a continuing nature. The second caution is that the initial and least dimensionally defined problem is not one of engineering but of political science. The engineer in the public service must act within the authority assigned him by legislation. Also many of the essential remedial measures must first be authorized by law.

The reasons are apparent why the inquiry into the engineer's relations to transportations must begin with the nature of government itself. The basic principle of political science involved is clearly expressed by a quotation from "The Meeting of East and West" (1) by Professor F. S. C. Northrup, in which he in turn quotes Thomas Jefferson;

"Although Jefferson recognized a general contribution by Aristotle, he wrote of Aristotle's more specific ideas concerning politics as follows:

> . . . so different was the style of society then and with those people, from what is is now and with us, that I think little edification can be obtained from their writings on the subject of government. They had just ideas of the value of personal liberty, but none at all of the structure of government best calculated to preserve it. They knew no medium between a democracy (the only pure republic, but impracticable beyond the limits of a town) and an abandonment of themselves to an aristocracy, or a tyranny independent of the people. It seems not to have occurred that where the citizens cannot meet to transact their business in person, they alone have the right to choose the agents who shall transact it, and that in this way a republican, or popular government, of the second grade of purity, may be exercised over any extent of the country.
>
> The full experiment of government democratical, but representative, was and is still reserved for us . . .
>
> The introduction of this new principle of representative democracy has rendered useless almost everything written before on the structure of government; and, in a great measure, relieves our regret, if the political writings of Aristotle, or of any other ancient, have been lost, or are unfaithfully rendered or explained to us."

The citizens of the United States alone have the right to choose the agents who as legislators enact the laws which express all policies and provide the authority for all action on behalf of the governmental unit they represent. Because of the nature of the problems which have become acute this discussion will center upon the highway engineer in public service, but it should be emphasized that the training, experience, competency and objective attitudes of comparable high quality are equally desirable and necessary for the technical staffs of contractor's organizations, suppliers of materials, designers and producers of road equipment and the transport companies.

The forces of individual and community desires and objectives as aided, and as controlled by, the service capacities and limitations of the existing types of transportation have largely determined the physical pattern of our national development. Our most difficult problems today are conflicts resulting from superimposing very large scale transportation changes on the physical patterns of town and country adapted to, and produced by, prior types of transportation.

The conditions which finally determined the need of and opportunity for, highway engineering in the terms of our present concepts lagged through three centuries of the nations' life except for a relatively short time as follows,

1st Period—1607 to 1785. Local control, statute labor on roads. The concept of technical competence did not generally rise above that of the surveyor or skilled artisan.

2nd Period—1785 to 1850. Most of the roads remained under local responsibility. A few routes for interstate and inter-regional traffic were undertaken by the States and the Federal governments and toll road companies with engineering direction.

3rd Period—1850 to 1890. The turnpikes built by the States and Federal governments reverted to local control. Others operated by private companies were largely liquidated. Engineering and legislative principles apply-

(1) Quotation by permission of the MacMillan Company, publishers.

ing to highway improvement which had emerged for a short term lapsed through the withdrawal of State and Federal interest.

After 1830, public attention and private energies were centered upon the spectacular extension of the steam railroads.

4th Period—1890 to the Present Time. The Transportation Revolution.

A listing of closely spaced events following 1890 identifies the causes of the transportation revolution but forecasts only fractionally the destined stature of the far reaching consequences of those new elements and major factors introduced into the transportation pattern. Moreover, the elapsed time covering the projection of the new types of transportation into a situation that had become static in the character of the services provided is so brief, and is even now so recent, there should be little confusion or amazement that multiple problems have been created that are yet unresolved.

Perhaps there may not be agreement with the listing of the events that mainly resulted in the transportation revolution but the selection is not submitted as complete or exclusive. In relation to time the listing of certain events does not credit the initial appearance of the idea. The dates in each case specify the first practical demonstration following which progress was continuous to general public use. This qualification applies particularly to the introduction of the new forms of transport, but other events recording legislation and administration departures have the same qualification, that is, a continuity of growth and extension of service without change or reversal of the foundation principles.

The major events activating the transportation revolution are these;

1. 1893—The establishment by the State of Massachusetts of the first State Highway Commission incorporating modern organizational concepts.
2. 1893—The establishment by the Congress of the Office of Road Inquiry to enable the Secretary of Agriculture to make inquiries as to systems of road management, investigate methods of road making and to disseminate information. Thus, the Federal Government renewed in a very modest way its interest in public road improvement after a lapse of more than one half century.
3. 1893—The first horseless buggy—involving substantially modern ideas is credited to the brothers Charles E. and J. Frank Duryea. Their first model was demonstrated on the streets of Springfield, Massachusetts in September, 1893, and a second model which had been designed to obviate defects that were apparent in the first, was also given a trial reported as successful on the streets of Springfield in January, 1894.

Photo by Courtesy Bureau of Public Roads

Fig. 2
1893 — First American Automobile.

Photo by Courtesy Bureau of Public Roads

Fig. 3
1918 — First Federal-Aid Road. The first road built under the 1916 Federal Aid Road Act was California Federal Aid Project No. 3 in Contra Costa County known as the "Alameda County to Richmond Road." It consisted of grading, draining and laying 20' wide bituminous concrete on a portland cement concrete base. Completed January 30, 1918.

1903—First motor driven airplane—Designed by Wilbur and Orville Wright and successfully flown at Kitty Hawk, North Carolina, December 17, 1903.

1914—Organization of the American Association of State Highway Officials.

This Association composed of the administrative and engineering personnel of the State and Federal highway departments has functioned effectively through the years to recommend legislation and to develop administrative and engineering principles and standards that are the sound foundation of State and Federal cooperation in the joint highway improvement program.

1916—The Basic Federal Aid Act. This is the initial Act which began on a national scale a long series of State and Federal laws which provide both thea uthority and the responsibility inherent in our modern practices of highway administration. These principles may be grouped as (1) administrative requirements and (2) permissive authorities. There are no major administrative requirements that did not have State origin. The Federal legislation extended a proven principle to nation wide utility for the joint program.

The emergence of the principles are conveniently related to the sequential Federal Acts which determines the first nation wide application but not usually first use by a State. Other important milestones of ancillary nature are included from the record of the years:

(2)

1. 1916. The requirement of an adequate State highway department.
2. 1916. The principle of adequate and continuous

(2) Partially quoted from a paper by the author, prepared for the 1954 Session of the Southwestern Social Science Association.

NATIONAL SYSTEM OF INTERSTATE HIGHWAYS

maintenance. Adequate maintenance is a condition for the continued availability of the Federal road funds. The expense rests upon the State, but does not impose the requirement of rebuilding. Reconstruction of roadways which have a good maintenance record is eligible for Federal participation.

This principle has emerged as one of the most basically important in its effect.

3. 1921. Road Classification. Required the selection of a Federal-aid system of roads not exceeding seven per cent of the total road mileage from the approximately 3 million miles of rural roads, on which the joint State and Federal funds were to be expended until the system was initially improved. The roads were to have primary intra-State importance and to connect at State boundaries with the routes of similar importance in the neighboring States, thus to insure a national system of inter-connected main routes.

4. 1921. The provision for engineering plans and specifications.

a. to determine the adequacy of the proposed improvements to meet traffic requirements.

b. to provide the quantities from which an estimate of cost can be made.

c. to provide the basis for agreement between the State and Federal departments.

d. to provide the basis for a contract with private companies for the construction of the work.

5. 1920. Organization of the Highway Research Board.

6. 1934. Planning and research. One and one-half percent of each Federal authorization is set aside to be used, with or without State funds, for planning and research. This provision has been instrumental in establishing and maintaining in each State the State survey unit as an integral part of the State highway department organization. This operation is a basic requirement of efficient administration.

7. 1941. Federal aid construction halted by Executive Order.

8. 1944. The selection of an urban arterial system. The legislation provided for the selection of a system of urban roads to include the extensions of the Federal-aid systems into and through the cities, and dedicated funds for the improvement of the system.

9. 1944. Secondary or feeder road system. The legislation provided for the selection of a secondary or feeder road system to articulate with the primary road system, and with each other, and to serve farm-to-market needs. Dedicated funds were provided for the improvement of the secondary system.

10. 1944. Inter-state System. The legislation provided for the selection of a system of major routes limited to 40,000 miles in both rural and urban areas to connect as directly as possible metropolitan and industrial areas, to serve the national defense, and to connect with national routes of Mexico and Canada.

11. 1945. Federal aid construction resumed by Act of Congress.

12. 1944. The 1934 authority to use 1½ per cent of the Federal authorization for engineering and economic research rewritten to include specifically urban and secondary road systems.

13. 1950. The legislation provided for an organiza-

Photo by Courtesy of Michigan State Highway Department.

Fig. 4
Edsel Ford Expressway at Detroit, Michigan.

tional unit within each State highway department to have administrative and engineering supervision over secondary roads.

14. 1950. Limited dedicated funds were provided for the Interstate System.

15. From 1916 to present. The long series of State laws and Constitutional amendments bearing upon and providing for State activities in highway improvement and administration.

In this succession of principles of highway administration and engineering there is a complete charter of all the elements essential for these two phases of highway improvement. It is the product of more than one-third century of State and Federal experience and practice, and includes full recognition of local interests.

The Highway Program After 1945

The Congress made a much more intelligent appraisal of the essential quality which highway transportation had acquired since World War I, than did the military authorities who were responsible for the drastic stop order on highway construction. At the same time that the stop order was in full effect, the Congress began extensive hearings as a basis for legislation to provide a post-war program that would more adequately provide for the accumulated inadequacies of the highways and the accelerated growth in the number, sizes, weights and types of motor vehicles using the roads. As a result of the careful investigation by the Congress, the program was not only greatly enlarged to aid in the improvement of the primary Federal aid system but provisions were included for dedicated funds to insure the building of a system of urban arterial roads and a system of secondary roads in each State.

Compliance with the terms of this legislation required road classification by selection of two very different categories of facilities. One, the most heavily used arterial streets within urban areas, and the second, the farm to market or feeder roads which normally carry very much lighter densities of traffic.

A major new principle of road classification in this Act provided for the designation of a national system of not to exceed 40,000 miles termed the Interstate System. The objectives are:

To interconnect by routes as direct as practicable metropolitan and industrial areas,

To serve the national defense,

To connect at border points with the routes of national importance of Canada and Mexico.

Transcontinental routes as such are not included as a major objective, since traffic of this character with very limited exceptions is a relatively small percentage of the total

Photo by Courtesy Bureau of Public Roads

Fig. 5
Trucks are essential in the movement of goods from the farmer to the market, and then to the retailer and consumer.

traffic on the main routes. The selection of routes which carry the major flows of intercity and interstate traffic produces as a by product an integrated pattern of routes that does serve long distance traffic. Nearly a quarter century separated the selection of the original seven percent Federal Aid system and the Interstate System limited to the equivalent of only one and a fraction percent of the public road mileage. In that period the factual data from the State planning surveys had become available and this fact was principally responsible for a remarkable result. It was the responsibility of the State highway departments to select and to recommend the roads within each State to be included in the Interstate System. It was the responsibility of the Administrator of the Federal Works Agency, acting through the Bureau of Public Roads to determine that the recommended routes articulated at State boundaries with routes of like importance thus to create a truly national system of continuous major routes and to approve the final system. To achieve this result the Administrator found it necessary to make only one adjustment of State recommended routes to provide continuity at the boundary between two States, in a total system of 37,000 miles of the principal routes of the country.

The successful procedure to deal with a nation-wide matter filled with economic and political implications is a demonstration of the constructive results that can follow the collection and analysis of full factual data. This does not mean a rehash of the existing readily available statistics which is too frequently termed research. In highway engineering and administration the easy things have been done. The need is for basic research and source material in the science of engineering and related economic, finance, social and political sciences.

By mid-century the authority and requirements incorporating the principles of highway administration necessary to accomplish the purposes for which the Federal aid funds were authorized had been enacted into law by the Congress. A lesson of experience is that the timing of the sequential introduction of new principles or policies in affairs of acute public concern must accord with the public mind.

The Essential Quality of State Highway Legislation

A very important qualification must be applied to the whole of this discussion. To illustrate how our modern concepts of the scope and the practices of highway engineering have grown through successive steps as the need emerged and the authority was incorporated in legislation, it has been more convenient to refer to the Federal legislation since this applied to all the States.

It should be emphasized that State highway legislation for individual States introduced many principles preceding their incorporation in the Federal laws. Reference has been made to the provision for the first State highway department of modern form in Massachusetts, and to the early classification of State highway systems. All the States have had to incorporate provisions in their laws to deal with a multitude of matters. Also the State laws have had to deal with problems of finance and of large mileages which are wholly outside any assumed Federal responsibility. Measures commensurate with the multiplications and the dimensions of the current highway problems can only be dealt with primarily by State authority embodied in legislation.

The virtue of the Federal legislation is to provide a desirable degree of stability, coordination and particularly research on a nationwide scale.

CURRENT PROBLEMS OF HIGHWAY ENGINEERING AND ADMINISTRATION

Reference has been made to the methods within our reach that hold the highest promise of successfully meeting current issues which have grown to challenging proportions. Were the public attention not so centered upon the alarms and portents of international tensions, there would be more impatience resulting from the deficiences of highway facilities and certainly more effective action to curb some of the contemptuous attitudes which infringe the rights of the individual so commonly in the misuse of the public roads.

While it is certain that determined methods, where these are in effect, are improving the safety of streets and highways, the subject is so broad only certain phases that are related to the specific problems of the provision for, and preservation of, adequate highways can be considered in this discussion.

The examination of these specific problems does not attempt final answers but does review the background of the current status and does present the "community of interests" and research approaches to more stable public policies and agreements. There are no final or ideal solutions since the conditions are dynamic and changing caused in no small degree by transportation itself. In the discussions of these problems the necessity for the highway engineer to intensify his knowledge of engineering science and to broaden his horizons becomes apparent. In exerting leadership for which his training and experience fit him he must join hands with the economist, the social and the political scientists and with the financier. All of these disciplines are required.

The Truck Problem

A current major problem is the optimum code of sizes and weights for trucks and the allied question of the rate of the charges for operating over the public highways.

As is so frequently true in public affairs, the accumulated investment and prior developments impose controls that are required to preserve the public's interests and property. New York State at a very early date built a large mileage of roads designed for traffic existing before there was any heavy truck traffic. This policy is typical of other improvement programs generally. The State of Illinois undertook the first large scale field test of roads designed for truck traffic in 1922-23, known as the Bates Road Test. The findings resulted in the adoption of a concrete slab section considered

Photo by Courtesy Bureau of Public Roads

Fig. 6
1830 — The Maysville Turnpike.

safe for the existing legal axle load of 16,000 pounds on solid rubber tires at 12 to 15 miles per hour speeds. At about the same time the Bureau of Public Roads conducted a long series of tests on solid rubber and pneumatic tires which conclusively demonstrated the superior qualities of the pneumatic type. The 18,000 pounds axle load on pneumatic tires was found through impact tests to be reasonably equivalent in effect upon the roads and with the universal change to the pneumatic type the Association of State Highway Officials approved the 18,000 pound axle load in 1942 and reaffirmed the same position in 1946.

As an important result of the Bates Road test and other research the roadway pavements built prior to 1941 and subsequently were generally designed for not exceeding an 18,000 pound axle load and a very large mileage was surfaced as stage construction with types only adequate for much lighter loads.

It is not only this very large investment that must be conserved, it is also the service for all traffic that must be protected from accelerated depreciation.

After a request originating with the Governors Conference, State highway officials, who were concerned with the observed effects on existing roads of the increasing number of heavier trucks, in 1950 organized to study problems of this nature under "the community of interests" plan. Eleven States, the District of Columbia, and the Bureau of Public Roads formed an interregional council on highway transportation and decided to conduct the test now known as "Maryland Road Test I." More than a quarter of a century had elapsed since the pioneer Bates Road field test. With this early test, only one state was primarily concerned. In the new test, which may be termed the "pioneer community of interest" test, in addition to the thirteen official agencies, seven truck manufacturers and fifteen petroleum companies provided equipment and supplies for the conduct of the test. The Highway Research Board, on request, assumed administrative charge of the test operations. Fred Burggraf, Director of the Board, reports, "broadly speaking, the four main results of the investigation were:

1. It furnished highway administrators and engineers with quantitive facts regarding the effect of axle loads of different intensity on a concrete road.
2. It increased our knowledge of the inter-relationships between loads, pavements, and sub-grades.
3. It developed new techniques in instrumentations for determining pavement deflections and strains produced by individual axles of trucks operating at different speeds.
4. It acted as a stimulus for further research."

For the second large field test, at Malad, Idaho, the Western Association of State Highway Officials again put into operation the "community of interest" plan. For this test, the highway departments of eleven states and one territory participated and engineers and technical services were furnished by the Bureau of Public Roads. Seven members of the Automobile Manufacturers Association furnished tractor-trucks. Eight trailer manufacturers furnished trailer bodies, and twenty-three petroleum companies furnished supplies and service facilities.

The testing program at Malad is not yet completed and will be continued this Spring (1954) followed by special tests and analyses and the drafting of a report.

The "community of interest" plan for organizing and financing large scale tests has amply demonstrated its merits. As a result of the experience gained and the deficiencies which have appeared in these two tests, one of concrete, and one of bituminous roadways, there is a pressing need to extend the same method of organization to conduct a third test in which all of the State and the Federal highway departments will participate as the official agencies. In addition, the Automobile Manufacturers Association, the American Petroleum Institute, the Rubber Association, and representatives of the trucking industry should be invited to participate.

The need for a third test of more comprehensive character has been recognized by the American Association of State Highway Officials, and the Bureau of Public Roads. A Committee of the Association has been developing the specifications for the test for a long time, and a second committee has been working on the design of structures to be included in the test. This latter for the first time.

The research projects all fit into a well-conceived plan incorporated in the outline of the overall problem by Committee Number Five, Department of Economics, Finance and Administration of the Highway Research Board. The title of the project is: "Economics of Motor Vehicle Size and Weight."

The Committee, aware of the complex inter-relations within the components of the subject, has divided the research operations into five phases, briefly indicated as follows:

Phase One—A study "to predict fuel consumption and travel time when related to the gross weight and net horsepower of a vehicle or a combination, and the rise and fall of a route profile."

Phase Two—A study of trends in size and uses of highway freight vehicles of the gross and axle weights required to carry full cargo-space loadings for specific commodities, of the character of highway transportation most serviceable to users and estimates of probable future volumes.

Phase Three—A study of the cost of truck operation per unit of freight carried.

Phase Four—A study of the relative and actual cost of roadways and structures to carry the range of gross vehicle and axle weights.

Phase Five—The analysis of the data and summary of the factual findings.

Photo by Courtesy Bureau of Public Roads

Fig. 7
The Pennsylvania Turnpike.

It requires the synthesis of the data gathered in the first four phases to remove questions, which are now causing contention, from the status of opinion to that of an authentic basis for reasonable discussion and agreement.

These studies are difficult and time consuming but it should not be necessary to sound any warning sirens that the stakes are very high. They are matters in which public and private interests are basically parallel, not antagonistic. Also they are matters in which highway engineering must take into account the economic, business, social, fiscal and legislative considerations and policies.

Only with adequate factual data which can be secured through the "community of interest" plan of research, the design of highways and the size and weight of vehicles can be brought into a mutually desirable adjustment.

The Urban Arterial Road Problem

The most difficult problem of highway traffic and highway facilities is that of the planning, the design, and the financing of urban arterial routes. This problem begins with the political situation, not partisan politics, although that is sometimes true, but rather the balance of power exercised in the State legislative bodies by the rural areas.

With this balance of power prevailing, the long lack of reasonably adequate improvement of so large a mileage of rural roads, had resulted in the lag of legislative support for measures to relieve the growing congestion in urban areas. Thus, until the Federal aid act of 1944 included dedicated funds exclusively for the building of an urban arterial system, in most of the States there was no participation by the State commensurate with the needs in either planning or financing arterial road systems. There had been important improvements in urban grade crossing eliminations, the cost of which had been largely borne by Federal funds. After the 1944 Act established the dedicated funds for use exclusively to aid in providing a system of arterial roads a substantial program of urban improvement was undertaken in the cities of most of the States.

It required the inducement of Federal legislation and financial assistance to establish cooperation between the States generally and their urban communities to undertake the most needed highway facilities within the State. The State Highway departments through their planning surveys were fully aware of the congestion and bottlenecks that were building up within the cities but had been unable to help effectively in the absence of legislative authority.

Once a method of cooperation was provided notable progress has been made in building and opening sections of arterial urban road systems. It has become even more certain that the undertaking is one of long range requiring highly intelligent and objective planning. There are conflicts which are the inevitable result of isolating the planning from the operation of public works. The planning function needs to be built into the pattern of organization of the responsible operating agents or agencies. There is need for consultants of specialized skills and for advisory citizen committees but the jurisdiction over the planning function should repose in the officials who are entrusted with the responsibility for, and have the authority to, budget the funds and exercise administrative control of the improvement program.

The success of the work of the State planning surveys leads to the conclusion that a logical continuing organization to provide for the urban planning of arterial systems, would be an urban planning unit, in which the State takes an active part. It now appears probable that Federal financial participation in highway improvements will be increased by pending legislation and because of other considerations, such as civil defense, in the absence of other financing for the planning operation, partial support could be secured under Section eight of the 1944 Federal Act which reads:

> "With the approval of the Federal Works Administrator, not to exceed 1½ percent of the amount apportioned for any year to any State under the Federal Highway Act, as amended and supplemented, except sections 3 and 23 thereof, shall hereafter be used with or without State funds for surveys, plans, engineering, and economic investigations of projects for future construction in such State, on the Federal-aid highway system and extensions

thereof within municipalities, on secondary or feeder roads, urban highways or grade-crossing eliminations, and for highway research necessary in connection therewith."

The general principle stated is authentic. It is inherent that the planning function is to be exercised by the agency (or agencies) responsible for the administration of the improvement program.

From the press release of February 15, 1954, by the Port of New York Authority and the Triborough Bridge and Tunnel Authority, the following is quoted:

"At the meeting Messrs. Moses and Pope stated that the critical need for 'overall solutions for the problem of destructive traffic congestion in the bi-state metropolitan area' made it imperative that the two agencies with the full cooperation of Governor Dewey and Governor Meyner and highway officials of the two States, Mayor Wagner and members of the Board of Estimate of New York City, as well as other local officials, civic organizations, and the press of the two States, had to 'pool resources and efforts in order to solve the problem of paralyzing traffic congestion'."

After the tremendous improvement programs that have been carried on by these two agencies, and the long planning efforts, the two officials responsible for the operations of the organizations have organized a new large scale planning operation which illustrates the "community of interests" approach perfectly. The examples set by Chairman Robert Moses and Acting Chairman Bayard F. Pope may very easily set a new pattern for urban planning that holds much promise for the future.

Basically the arterial highway problem for metropolitan areas is most acute because it is one of the series of major problems of urbanization. These problems are so important that consideration has recently been given the recommendation of the Highway Research Board that the National Research Board establish a temporary Council-wide committee to study and report the need for and scope of, urban research.

Mr. H. S. Fairbank, Deputy Commissioner, Bureau of Public Roads, in charge of research expresses the predicament of the highway administrator and engineer precisely in these words, "Still, we could plan with much more assurance and comfort if we could clarify and unify somehow the understanding of where we are headed in the form and ecology of the city organism. That calls for a broad study of urban growth and expansive trends, utilizing all the disciplines that may contribute and there is now a move in that direction."

There is no more important area for research affecting as it does so large a percentage of the population. The Automotive Safety Foundation which has been consistently alert to support undertakings of real productive worth is interested and it is to be hoped strong support will be given the development of an adequate urbanization research project.

Highway Laws

In 1951, the Executive Committee of the American Association of State Highway Officials requested the Highway Research Board to sponsor a study of the highway laws of the States to encourage and assist in their modernization. Because of the very extensive scope and the important nature of the proposed project, the Research Board appointed a steering committee to make exploratory studies to recommend organization and procedure for proper conduct of the project.

Mr. Louis R. Morony, Director of the Laws Division of the Automotive Safety Foundation, was appointed chairman and Mr. David R. Levin, of the Division of Research, Bureau of Public Roads was appointed Secretary. In a progress report to the Legal Affairs' Committee of the American Association of State Highway Officials in November last, Mr. Morony said:

"Postwar, it has become painfully evident that highway laws have not been keeping pace with technical advances and modern concepts of highway engineering and management. In state after state, highway departments have been confronted with legal road blocks—not only in projecting long-range programs but in trying to reorganize to perform routine tasks more efficiently."

The laws are most seriously defective in their failures to provide for efficient working relations between the State and its cities and also the State and its counties. This subject and its implications have been reported in the following:

"State-City Relationships in Highway Affairs," by Norman Hebden and Wilbur S. Smith.

"Effective Administration in State-City Highway Activity," Yale Bureau of Highway Traffic.

Also Highway Research Board bulletins, Special Report, No. 6, Bulletin 66, and Special Report, No. 9.

These reports and publications are valuable contributions of research and are included for reference since the general subject has received wholly inadequate attention.

The project for the analyses of State laws is of outstanding importance.

The Question of Toll Roads

The term "toll road" is generally understood to mean any road for which a service charge is collected for each time it is used in addition to any general taxes or fees which may be paid by all highway users. Considered as an element of highway administrative policy, the term "toll roads" must be more closely defined, in which the method of providing the funds to cover the cost identifies the type of project. With this distinction there are four types of toll projects now in operation, under construction, or projected. These may be briefly defined as follows:

Class 1—The construction cost is provided from public funds. On completion the service charge is fixed for the use of each section, which is determined to be a fair charge for the service rendered.

Class 2—The construction funds are provided by the sale of revenue bonds, but the interest and amortization of the bonds are guaranteed the State. The States generally require a constitutional amendment before State guaranteed bonds can be issued.

Class 3—The construction funds are provided by the sale of revenue bonds, which are wholly dependent upon the earnings of the project for amortization and interest. Such projects are administered by a board or commission created by the State but the State does not guarantee the payment of either bonds or interest. This Class 3 is termed here the conventional toll road since up to the present there are numerically more of this class in operation and authorized than of any other class.

Class 4—A State by legislative action grants authority to private interests to build a toll road project. The construction funds are provided by the sale of revenue bonds and the revenue from tolls is expected to cover the amortization and the interest accruals of the bonds.

Photo by Courtesy Bureau of Public Roads

Fig. 8
Santa Ana Freeway at Los Angeles, California.

To make possible the operation as toll road, of any of the above classes, it is necessary that the design be of the controlled access type with cross-traffic at grade eliminated. The design of the controlled access, expressway types affords greater safety, saves time and provides other qualities of service over the normal highways. Experience indicates it is the only type of design that does not progressively deteriorate in traffic capacity caused by roadside interferences. It is customary for all types of transportation to charge for facilities furnished above the normal, such as the Pullman charges for rail travel. It is not then a departure from normal transportation practices to make an additional charge for use of superior services offered by the controlled access expressways. The matter then becomes two specific problems. First, what acute problem can a toll highway best satisfy and second, what plan of administration and financing will provide the facility at the minimum cost to the public?

The most pressing problems of highway facilities in general are the need for arterial roads in metropolitan areas. At the opposite extreme, is the very large mileage of secondary or farm-market roads, which, because of the magnitude of their mileage, require very large sums for construction and maintenance. Neither of these two widely separated demands can be met by the conventional toll road but for very different reasons. Nor does the conventional toll road offer a fiscal solution for more than a very minor percentage of the more than 400,000 miles total of State-administered primary rural highways with their urban extensions. Very opportunely the Congress in the Federal Aid Act of 1954, has authorized the Commissioner of Public Roads to make a comprehensive study of all phases of highway financing, including the relations of toll roads to the State and Federal aid highway program and to make a report to the Congress by February 1, 1955. This is unquestionably the most important study that could be made now and while the time allowed is extremely limited, the whole-hearted cooperation of the State highway departments will permit the production under the direction of the Commissioner, of a most valuable report which will serve as a better basis for the determination of future policies than is now available.

A few States have discarded the principle inherent in the Class 3 type of financing, that is, revenue bonds issued under State authority, but not supported by State credit. Among these States are New York, New Hampshire and New Jersey for the Garden State Parkway. These States have turned to the Class 2, method of financing, that is, State supported revenue bonds. The difference is a highly important composite of State economy and State ethics.

Since the New York Thruway with its projected extensions is by far the most important toll road system that

has yet been undertaken, there are a number of major principles of responsive government policies and advanced highway administration that merit attention and command faith in this great enterprise.

1. The people of the State of New York were given an opportunity to approve or disapprove the project through a constitutional amendent, and to vote authority to guarantee the interest and the amortization of the revenue bonds to be issued for financing the cost. The approval of this great project not only made the public partners in the enterprise, but has the highly profitable effect of saving an estimated $100,000,000 in interest charges alone over the life of the bonds.

2. The administration under the general direction of Governor Thomas E. Dewey is the immediate responsibility of the New York Thruway Authority, of which Mr. B. D. Tallamy is the Chairman. Mr. Tallamy is also the Superintendent of Public Works. The other members of the Thruway Authority are:

Mr. David J. Martin, Vice-Chairman

Mr. R. Burcell Biggsby, Secretary-Chairman

3. Mr. Tallamy and his associates on the Authority, have pursued policies for accomplishing the work that can not be too highly endorsed. The Department of Public Works has been called upon for planning, design and construction. The State thus has, the advantage of organized and effective teamwork without raiding the Department of Public Works for its competent engineering staff. Not only does the State reap the advantage of a going organization, there are also reciprocal benefits accruing to the employees in the way of stimulating experience and pride in the accomplishments. A word of caution is important that only such a plan of operation can be successful when the highway department is on a non-political, career-service basis.

4. Not only has the Authority depended upon the Department of Public Works, it has extended the same policy of solicitating the participation and the assistance of the Departments of Law, Audit and Control, and the Divisions of the Budget and Standards and Purchase. It is difficult to conceive of a better conceived plan of integrating the efforts of the organized departments of State government to carry to successful completion a very large enterprise.

The Problem of the Complete Road System

The "community of interest" plan of attack upon the over-all road problem is an undertaking of perhaps equal importance in which the Legislature of the State of New York provided for a Temporary Highway Finance Planning Commission. Under general direction of Governor Dewey, Mr. Charles H. Diefendorf is the Chairman of the Commission and Mr. Tallamy is also a member. The report of the Commission filed under date of February 27, 1954, is a remarkable summary with recommendations of the total highway needs of the State as seen at this time, and provides a plan of financing for a seven-year period in advance. The operations of good government in dealing with the subject matter of highways for the service of the whole State, must make use of the most advanced techniques and research data that can be brought together. Such a course permits conclusions which are the resultant of the facts.

The basis of the report is a complete inventory of the roads of the State, their current condition and the needs of improvement based upon traffic service requirements. These data are products of the Department of Public Works planning surveys, and in addition the surveys of the County Superintendents and the local town authorities. The Committee before final action called upon the Automotive Safety Foundation for a thorough and critical review of the proposed findings. The Foundation assigned engineers and others from its staff who have long and extensive experience in making highway "needs studies." They were also assisted by specialists from the Bureau of Public Roads. The Committee took advantage of every modern technique to make the report completely factual and objective. The report is of outstanding importance, since it recognizes the vital principle that the State is not well served with highways until all of its people are served. The recommendations provide for the financing of a program that, if approved by the State legislature, will in a seven-year period provide in excess of $2,000,000,000 for construction at all levels. It will virtually assure the completion of the inter-city arterial routes, and so greatly extend rehabilitation of the other systems that traffic conditions will be improved beyond present hope.

Academic Training

In the dynamic areas created by changes in transportation itself, and changes brought about by transportation, there is great need for a constant flow of graduate students to the State and Federal highway departments, and to those of the cities and rural road organizations. Not only are graduate engineers needed, but those who have training in the fields of law, business, economics, and the social sciences. Successful highway administrative organizations of the future will need more diversified competences than that of technical engineering only. It would assure a constantly increasing improvement in government administration if a plan were made effective to combine academic study and pre-graduate training in the State and local highway organizations followed by a post-graduate specialized training in particular sciences and business.

Technical Assistance for Under-Developed Countries

The joint academic-highway department "science-with-practice" program of training for government service has universal application. The principles of highway administration and engineering which have matured in our own country through long trial-and-error experiences and through research, have non-controversial and constructive values if held out to under-developed countries as a major element of the foreign technical assistance program. But these principles cannot be applied directly. Many countries are severely handicapped in the development of their economy by the lack of highway transportation because of their inability to organize the administration and the operations to secure improved highways. The futility of sending for a short time a few unorganized technicians, no matter how competent, into such countries is immediately apparent. The long experience in this country has proved the essential quality of a well-conceived technical organization, competent to handle the various operations of highway improvement. Technical advice cannot be relied upon for accomplishment. Education and training are needed to provide an organization to advise.

A country possessing natural resources is under-developed because it does not have the personnel from which trained organizations can be formed for many public services. These are the countries which have been exploited with bitter after-

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Development and Needs of Virginia Highways

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Fig. 1
Shirley Memorial Highway. This was Virginia's first controlled access highway.

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Developments Since 1906

IN 1906, the General Assembly of Virginia established the State Highway Commission. The principal duties of the Commission consisted of promotion and giving technical assistance to the counties. A motor vehicle in those days was an oddity. Travel was by rail, horse or on foot.

Many developments have taken place since 1906 that have played major roles in the development of our highways. These are:

1. Motor vehicles required to be licensed in 1910.
2. First Federal-aid allotment to State in 1916.
3. Legislative Commission appointed in 1916 to lay out a highway system connecting the larger population centers of the State.
4. Primary System of highways designated in 1918—a total of 4,002 miles.
5. Three-cent gasoline tax adopted in 1923.
6. Four and one-half-cent gasoline tax adopted in 1926.
7. Five-cent gasoline tax adopted in 1928.
8. The creation of the Secondary System of Highways in 1932.
9. Six-cent gasoline tax adopted in 1946 (with 30 per cent plus $2.5 million dollars of this extra cent to go to the Secondary highways).

Down through the years, Virginia has ranked near the top in good roads. Virginia's "pay as you go" policy of highway financing has been the envy of citizens of many states. Other significant policies followed in Virginia and admired by engineers and voters in other states are:

1. Dedication of proceeds from the gasoline tax and motor vehicle licenses to maintenance and construction of highways.
2. State control over Secondary roads.
3. Absence of politics. Since 1906, a total of forty-seven years, Virginia has had only four Highway Commissioners. Hundreds of employees have over twenty years of service. Many of our high officials have more than thirty years with the Department.

Under the above policies, the State Highway System has grown rapidly in extent and in improved construction and maintenance. Virginia's highways rank high nationally, and we are indeed proud of what has been accomplished. This

Fig. 2
Mileage of three-lane roads is being reduced as rapidly as possible.

is especially true of our Secondary roads commonly referred to as County roads in other states.

Obsolescence on Our Highways

Despite this phenomenal growth and improvement, the hard fact is that Virginia's highways have not kept pace with traffic needs. Many of our highways are wearing out and becoming obsolete. Many more are in urgent need of widening and other improvements. Yes, it is true that obsolescence, the dreaded enemy of all highway engineers, has really started to work on our highways.

The problem of providing safe and adequate public highways is rapidly becoming the number one domestic problem in the United States. This is borne out by the widespread discussion of the subject in newspapers, in the magazines, on radio and television programs, and even in essay contests.

Obsolescence is not peculiar to Virginia. The same situation exists in all forty-eight states.

Since 1945, forty-five states have conducted surveys with a view to devising ways and means to meet the highway crisis.

In 1940, Virginia, like her sister states, believed that the highway problem was well on the way to being solved; that in a few years, with the increased revenue anticipated, all normal needs would be taken care of. Then came World War II. Motor vehicle traffic dropped, construction was curtailed, and revenues dropped. The net result was that when the war was over in 1945, our maintenance as well as our construction programs were behind.

The post-war years brought an unprecedented upsurge of motor vehicles using the highways and a marked change in the nature of highway traffic and in road requirements and needs. One fact serves to underline the serious nature of the highway problem. It is this: traffic anticipated for the year 1965 is actually using Virginia's highways today — Yes, twelve years ahead of schedule.

In order to understand fully the State's over-all needs, one must of necessity be aware of the magnitude of our highway system.

Responsible For All Rural Roads

Only four states have assumed responsibility for all rural roads. Virginia is one of these. There are 48,395 miles of highways administered by our Highway Commission. (The only exceptions are county roads in Arlington and Henrico which are maintained by those counties.)

The general impression is that Virginia's highway system is well developed, comparable to those in the more advanced states. Broadly speaking, this is true. It would be unfortunate, however, if the people of Virginia conclude that the present highway system is adequate to sustain the burdens imposed upon it by the traffic of today and tomorrow. Moreover, it must be recognized that many of the essential parts of Virginia's highway system, spread over an unusually wide area and designed and built many years ago, are now obsolete. Other parts are rapidly becoming obsolete as a result of the traffic to which they have been subjected within the past few years.

Virginia's highway network is divided into three groups, namely, Primary, Secondary, and Urban roads. Each will be discussed briefly.

A. The Primary System

The importance of the 8,355-mile rural Primary System is emphasized by the fact that, although it comprises less than 18 per cent of the total rural mileage, it carries 82 per cent of the total rural traffic.

It is on the Primary System that the majority of accidents occur, and congestion, delays, and time-loss in travel are most serious. These were the first roads constructed in the State and, hence, they are most in need of modernization. They require especially high standards of design with respect to curves, gradients, sight distance, and width and strength of pavements. Naturally, maintenance and replacement costs are heavy.

B. The Secondary System

The Secondary System embraces 40,040 miles of principal feeder and connecting roads in ninety-six counties of the State. Two counties, Arlington and Henrico, by choice, maintain their own county roads.

When the State took over these local county roads in 1932, only 2,000 miles were hard surfaced. Today, over 14,000 miles are hard surfaced.

Less than 3,400 miles are unsurfaced today, compared with 25,000 miles in 1932.

C. Urban Extensions

Urban extensions include 413 miles of streets in forty-nine cities and towns of the State. These are parts of the Primary System in the sense that they are city thoroughfares which are closely connected with interstate and intrastate transportation.

The importance of Urban streets to interstate and intrastate transportation is clearly recognized. It is not too much to say that in the urban areas, the through streets as well as the principal streets affording access to the business section are now essential parts of the State Highway System.

Why Are Our Highways Inadequate?

1. Population

Virginia has much to offer. Its location is especially inviting to the establishing of military camps and bases, industry and home seekers. As a result, the population of Virginia has increased tremendously since highways were developed.

II. Motor Vehicle Ownership

In 1933 there were fourteen motor vehicles in Virginia for every 100 Virginians. By 1940, there were nineteen vehicles for every 100. In 1950, there were twenty-nine, or twice as many, per 100 persons as in 1933. Recently, one of our consulting firms estimated that by 1970 there would be 35 vehicles for every 100 Virginians.

There were 1,034,011 motor vehicles licensed in Virginia last year. Compare this with only 596,266 in 1941. Every year since 1946 has shown a substantial increase. By 1970 it has been estimated that we will have approximately 1,500,000 vehicles registered in Virginia.

Of particular importance has been the increase percentage-wise of large trucks and buses. Since 1941 bus registration has increased 230 per cent and trucks 124 per cent.

III. Traffic

Virginia is a "bridge" or "corridor" State and thus catches a heavy burden of through traffic.

Traffic counts have been taken on Virginia's Primary System since 1927. Accurate vehicle-mile data are available since 1938—a total of sixteen years through 1953. The trend since 1938 has been upward, except during the war years, as shown by the following table.

Year	*Vehicle Miles Per Day*	*Increase or Decrease*	*Increase or Decrease Compared to 1938*
1938	6,756,943		
1939	7,329,841	+ 8.47	+ 8.47
1940	7,653,415	+ 4.41	+ 13.27
1941	8,878,160	+16.00	+ 31.39
1942	2,826,740	— 0.58	+ 30.63
1943	5,830,509	—33.94	— 13.71
1944	5,878,229	+ 0.82	— 13.00
1945	6,058,094	+ 3.05	— 10.34
1946	8,649,112	+42.77	+ 28.00
1947	10,339,968	+11.95	+ 53.02
1948	11,477,044	+11.00	+ 69.85
1949	12,565,503	+ 9.48	+ 85.60
1950	14,027,576	+11.16	+107.60
1951	15,390,829	+ 9.72	+127.78
1952	16,586,412	+ 7.77	+145.47
1953	17,733,813	+ 6.92	+162.45

Of particular interest is the change in travel by the different classes of vehicles.

(a) Virginia passenger car travel has increased 154 per cent since 1938 and 93 per cent since the highest pre-war year, 1941.

(b) Travel by out-of-state passenger cars has increased 171 per cent since 1938 and 106 per cent since 1941.

(c) Travel by all commercial vehicles has increased 179 per cent since 1938 and 115 per cent over that recorded in 1941.

(d) The greatest increases have been shown by buses and tractor-trailer combinations—an increase of 315 per cent over 1938 and 160 per cent when compared to 1941.

A distinct characteristic of motor vehicle traffic is its heavy concentration on relatively limited parts of the highway system. Arlington County leads all areas in traffic volumes. For the average 24-hour day during the past fiscal year ended June 30, 1953, the average mile of Primary highway in Arlington County carried 15,566 vehicles.

Fig. 3
Inadequate bridge at James River on U.S. Route 60.

Of the longer routes in the State, the heaviest traveled are Routes 1, 11, 29, 13, and 301. These routes represent only 10.7 per cent of all rural Primary mileage, yet they carry 26 per cent of all rural Primary travel and 30.8 per cent of all commercial traffic.

Of interest is Route 1. This Route represents 2.14 per cent of rural Primary mileage, and carries 8.92 per cent of rural Primary travel and 23 per cent of all rural Primary travel by tractor-trailer units.

IV. Highways Cost More

Revenue available for highway construction has more than doubled since 1941. But this increase has been nullified by the following factors:

(a) Today's highway dollar is worth only 40 cents when compared to the 1941 dollar.

(b) Stronger, wider, and straighter highways are needed, as well as expensive signs, signals, and markings; also, miles of curb and gutter, divided highways, and sidewalks.

(c) Many miles of roads are wearing out, having in most cases exceeded their life expectancy.

Highway Needs Study

During the last fifteen years, three reports have been released concerning our highway problems. The fourth report will be ready before the first of the coming year.

(1) 1939—Senate Document No. 6—The Weaver Report

This was the report of a special Commission appointed pursuant to Senate Joint Resolution No. 14. The Resolution was adopted by the General Assembly during the 1938 session. Its purpose was to make a study of the Primary and Secondary Systems of highways in Virginia.

This study revealed the many inadequacies affecting our highways. It also showed that many roads built in 1920 could not hope to take care of traffic in 1940.

In analyzing the highway problem, the report looked ahead to 1960 and estimated the cost of needed improve-

ments plus the expense of completing the Primary System needs would be $326 million dollars.

(2) 1945—The Twenty-Year Plan

The Twenty-Year Plan is a factual report and deals with all three of our highway systems, Primary, Secondary, and Urban.

Based on the historical trends, an attempt was made to forecast highway receipts, population, motor vehicle ownership, and distribution of funds.

In making our forecasts, we had no idea that such a tremendous upsurge would take place in travel. It was estimated that traffic would double by 1965.

The findings of the Twenty-Year Plan were most enlightening, especially with regard to our Primary System.

Findings

The Twenty-Year Plan showed our needs to be many and that to provide adequate highways during this period we would have to correct the following deficiencies:

(a) 3,300 unsafe curves
(b) 15,000 locations with inadequate sight-distances
(c) 1,536 miles of roads 16 feet or less in width.
(d) 2,979 miles of roads only 18 feet in width
(e) 3,518 miles of roads of inadequate design needing widening, strengthening, and relocating
(f) 846 inadequate bridges
(g) 199 railroad crossings in need of separation structures or additional protection

Cost of Improvements Needed

Exclusive of grade crossing eliminations, it was estimated that to provide reasonably comfortable and safe facilities, a total of $563,000,000 would be needed.

Although it looked to be a tremendous task, Highway Department engineers thought it could be done. The fiscal year 1946-47 marked the start of the program. This past fiscal year, 1952-53, was the seventh year. A preliminary check reveals that the program is at least 20 per cent behind schedule.

At first this appears that our progress can be called satisfactory. However, due to the tremendous increase in traffic, what we thought would be needed by 1965 is needed today—just twelve years ahead of schedule.

(3) 1951—Highway Needs in the Emergency

In 1951 under the guidance of the Automotive Safety Foundation, a detailed engineering analysis was made of 2,700 miles of Virginia's main roads and urban extensions.

A sufficiency rating was developed mile by mile to gauge structural condition, ability to handle traffic, and safety elements. These ratings are indicators of relative need and a tool in determining the degree of adequacy.

Findings

1. That of the rural mileage (2,475 miles), 800 miles were already deficient, 756 miles would become deficient during the next ten years, and 919 miles would remain tolerable for the next ten years.
2. The estimated costs for 2,475 miles of rural roads studied were $250,000,000. This figure included backlog needs, future needs, and maintenance.
3. The same data for the 223 miles of Urban extensions showed an estimated cost of $95,000,000.

This study was based on traffic for the fiscal year 1950-51. The A.S.F. Engineers estimated that traffic would increase approximately 35 per cent in the next ten years.

Our 1953 traffic analyses show that in only two years since the A.S.F. study, traffic has increased 15.22 percent.

Study Underway

We are now completing a most comprehensive study of the needs of both Primary and Secondary Highways. This study is a continuation of the A.S.F. study and includes a detailed study of all rural Primary highways. A complete but not so intensive study is being made of the Secondary System.

At the time this is written, the study is not complete. Preliminary analyses reveal, however, that the needs on our rural Primary System alone will amount to approximately $619,000,000 by 1965.

In the foregoing, I have attempted to go into the many factors affecting our highways. Our Primary highways (including Urban extensions) are the backbone of our State Highway System, and to a large degree support our Secondary System.

Our chief problems concern the Primary highways. Last year we had $18,859,702 available for rural Primary construction, and this year $20,285,820.

It takes no magician to see that more money must be made available to the Primary System if we are to catch up on our needs and keep pace with ever increasing traffic loads.

Toll Roads

One opinion is that our trouble can be partly cured by toll roads. Study shows that this is not possible. Toll roads must be self-liquidating and to date in only one location (from Richmond to Petersburg) is a toll road believed to be justified.

It is my frank opinion that within the next ten years, there will be less than 200 miles of toll roads in Virginia, and in all probability less than 100 miles.

A toll road provides at best an answer to a particular problem and will not provide the solution to our over-all problem.

Conclusion

Virginia's highways are among the State's greatest assets. Future agricultural development and industrial growth in Virginia depend to an unusual degree upon the development of the highway system. Educational, health, and recreational opportunities are also dependent on modern highways.

It has been truly said that the highway user pays for good roads whether he has them or not. We can pay for good roads and the comfort, safety, and economy they offer directly by providing funds for their construction and improvement, or we can pay for them indirectly through repair and depreciation of motor vehicles, through the larger consumption of motor fuels, through loss of time in travel, and more important, through loss of life and property damage caused by accidents.

Time is an important element in the highway picture. It presents this fundamental question: "How many years are we willing to wait for the roads and streets we need now?" *We pay for good roads whether we have them or not.*

In the final analysis, the responsibility for providing adequate means for good highways rests with the people of Virginia.

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THE ENGINEER'S RELATION TO HIGHWAY TRANSPORTATION

(Continued from page 369)

math. For most of these countries the ideas of technology, to the limited extent they exist, are a superficial over-layer. The subject is too complex to be more than touched upon here, but it is a field in which the educational institutions could make a great contribution. Without doubt technical assistance of permanent value can be provided by a plan which would involve the establishment of a school for training in the country itself, undertaken as a self-contained responsibility by a College or a University. Assignments for the teaching and training staff should be from the staffs of the institution and the highway departments.

The time required to obtain enduring results is not short. It would probably take ten years to show much in the way of progress, but unless we are willing to make the serious effort needed to train sufficient young men to staff the governmental operations that are required to provide improved roads, it would be much better to abandon attempts in this field. This same conclusion holds for other areas involving engineering and applied technology.

In conclusion the expanded horizons of the highway engineer are apparent. So are the requirements of greatly increased competency in the sciences of engineering and allied fields of technology, but these are not more important to the future of the highway engineer than in his recognition of the need of the "community of interest" approach to important problems through research.

The highway engineer in public administrative positions must welcome the opportunity to exert leadership in the organization of those who logically belong to the "community of interests" to carry into effect broad research which alone can provide the facts for major policy and technical decisions.

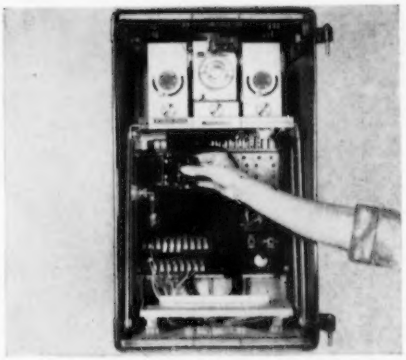
The Colleges and the Universities have facilities and staff which can make possible invaluable teamwork with the highway departments in the multifaceted program of research required to meet the problems of highway transportation which are related to the economy, the social welfare, and the security, of the multitude of communities composing our nation.

Significant undertakings of this character are now underway in a number of important educational institutions and plans are being made by others for similar participation. The outlook for an accelerated rate of advance in our understanding of transportation is encouraging and we have only to accept the evidence of our own eyes for proof of the day-by-day advance in the physical facilities available.

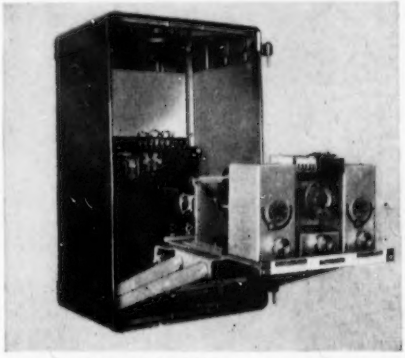
The source of our gravest difficulties is the failure to adjust ourselves to safe and ethical use of the transportation we have created.

Most of all we need a new attitude toward transportation, a new spirit that lives in the message of St. Paul to the Philippians, "Whatsoever things are true, whatsoever things are honest; whatsoever things are just, whatsoever things are pure, whatsoever things are lovely, whatsoever things are of good report, if there be any virtue, and if there be any praise, think on these things."

EASY TO SEE components like dial unit, timing knobs, as in Type F, make servicing easy.

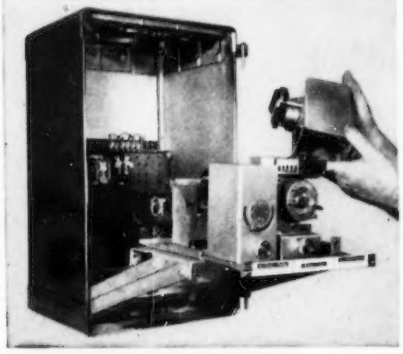


JACK-MOUNTED RELAYS make field servicing take less time—saves man-hours and labor costs.



TIMER SWINGS OUT on pantograph arms, for easy inspection and maintenance in the field.

TIMER IS EASILY REMOVED for fast servicing by just twisting two half-turn fasteners, unplugging Jones plug, and lifting.



SIMPLE FIELD OPERATION is assured with jack-mounting and unitized construction. Here extension limit relay has been unplugged.

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TRAFFIC NEWS

Institute Announces Awards for '53

Ten American cities and eight states have been cited by the Institute of Traffic Engineers for "outstanding achievement in traffic engineering during 1953."

The cities and states thus designated by the Institute's Committee of Judges will be awarded plaques indicating national recognition based on significant accomplishments in the areas of traffic control devices, traffic surveys, street lighting, intersection design, traffic administration, and highway planning.

Announcement of the award winners was made in Detroit, Michigan, June 18, by Donald M. McNeil, Institute President, at a special luncheon given in honor of the Officers and Directors of the Institute by the Streets and Traffic Commission of Detroit. A large gathering of Detroit business and industrial leaders heard Edward T. Gushée, Commission President, and Vice-President of the Detroit Edison Company, pay special tribute to the traffic engineers of the country. Mr. Gushée pointed out that the traffic engineering profession was making a substantial contribution to the national economy through the application of engineering techniques in solving the most serious traffic problem that faces every American city. Gushée added that traffic engineers were to be commended for their judicious use of common sense in arriving at solutions to this problem.

In announcing the awards President McNeil singled out Detroit a top award winner for five consecutive years, and added that the state of Michigan has also received the Institute's traffic engineering award for the six consecutive years since the program was inaugurated in 1948.

The awards by *states* were decided in four regional groups and a fifth group including the eight most thickly populated and heavily trafficked states. The awards are as follows:

GROUP I — Eastern Region — First Place, *New Jersey;* Second Place, *Connecticut.*

GROUP II—Southern Region—First Place, *Virginia* (5th consecutive year); Second Place, *Florida.*

GROUP III — Midwest Region — A duplicate First Place to *Minnesota* (6th consecutive year) and *Oklahoma* (2nd consecutive year).

GROUP IV — Western Region — A duplicate First Place to *Washington* (4th consecutive year) and *Oregon.*

GROUP V—Heavily Populated and Trafficked States — A duplicate First Place, *California* (4th consecutive year) and *Michigan* (6th consecutive year).

The winning cities and second places are:

GROUP I—For population of 1,000,000 and over, First Place, *Detroit,* Michigan: Second Place, *Los Angeles,* California.

GROUP II—For population of 750,000 to 1,000,000—First Place, *Cleveland,* Ohio; Second Place, *Washington,* D. C.

GROUP III—For population of 500,000 to 750,000 — A duplicate First Place to *Milwaukee,* Wisconsin (last year's winner); and *Pittsburgh,* Pennsylvania.

GROUP IV—For population of 350,000 to 500,000 — First Place, *Denver,* Colorado; Second Place, a tie between *Kansas City,* Missouri, and *Louisville,* Kentucky.

GROUP V—For population of 200,000 to 350,000—First Place, *Richmond,* Virginia; Second Place, a tie between *Providence,* Rhode Island, and *Rochester,* New York.

GROUP VI—For population of 100,000 to 200,000—First Place, *Phoenix,* Arizona; Second Place, *Charlotte,* North Carolina.

GROUP VII—For population of 50,000 to 100,000 — First Place, *Fresno,* California; Second Place, *Evanston,* Illinois.

GROUP VIII — For population of 25,000 to 50,000—First Place, *Wausau,* Wisconsin; Second Place, *Miami Beach,* Florida.

GROUP IX—For population of 10,000 to 25,000—First Place, *Two Rivers,* Wisconsin; Second Place, a tie between *Peru,* Indiana, and *Wilmette,* Illinois.

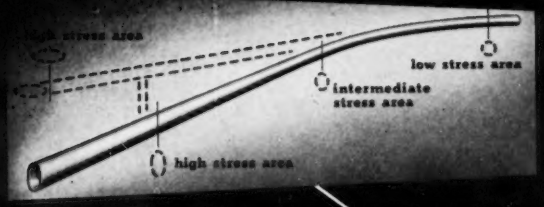
The Institute of Traffic Engineers directs the assembly of traffic engineering accomplishments submitted in the Annual Inventory of Traffic Safety Activities upon which the awards are based. The Committee of prominent Institute members which judged the achievements consisted of Chairman Maxwell Halsey, Executive Secretary, Michigan State Safety Commission, Lansing; Charles A. Goodwin, Traffic and Transportation Engineer, Liberty Mutual Insurance Co., Boston; Gordon K. Gravelle, Transportation Engineer, Automotive Safety Foundation, Washington, D. C.; Edward R. Klamm, Accident Prevention Manager, Allstate Insurance Company, Chicago; Light B. Yost, Director, Field Operations Section, General Motors Corporation, Detroit; and Charles W. Prisk, Supervising Transport Research Engineer, Bureau of Public Roads, Washington, who is also Vice-President of the Institute of Traffic Engineers. Mr. Harry Porter, Jr., Vice President of the Institute, served as secretary to the Judges Committee.

Forty-seven states and eight hundred and forty-six cities participated in the 1953 program by submitting returns and data on their traffic engineering performance during 1953.

Transportation Grows

Transport growth industries—airlines, barge lines, and petroleum pipe lines—continued to establish new records in volume of traffic handled despite the general dip in the nation's economy during the first half of 1954. That, according to the Transportation and Communication Department of the Chamber of Commerce of the United States, is one of the highlights brought out in its midyear "Transport Review and Outlook."

The Chamber's review also shows that motor vehicle travel on both city and rural highways continued to rise, although the other segments of the vast transportation industry experienced a drop in business. A brief outline of the mid-year review shows:



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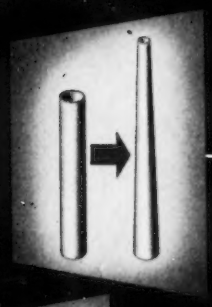
FIRST to develop fabricating equipment and methods to permit use of high strength aluminum alloys.



FIRST to develop and produce seamless, tapered shafts from high-strength, extruded tubing in a wide range of diameters.

FIRST to pioneer the Aircomatic method of welding for fast, strong welds and negligible deterioration of alloy strength. All P & K welds are guaranteed . . . all P & K welding personnel and equipment is certified by U. S. Government agencies.

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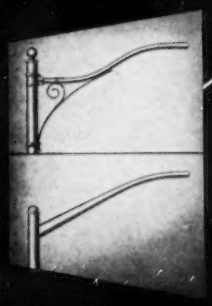

FIRST to eliminate unnecessary scrolls, tie-rods and other ornamental frills.

FIRST to design and build its own tapering machine to handle all diameters of extruded aluminum tubing.

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General Economy — So far, drop in general economic activity has been mild. Consumption has held up, but production has dropped. Latter is picking up, however, and chances of a modest upswing in general business activity by fall are good.

Automobile Manufacturing — Output running about 10 per cent under last year, with General Motors and Ford's combined share of total market over 80 per cent. Sales good, but dealers' operating profit very low. Output for year estimated at slightly more than five million cars.

Aviation — Passenger-miles up 10 per cent over last year. Should hold up about this much for year. Cargo and freight traffic down rather sharply. Increased carrying capacity has pushed load factors down and expenses up. Mail traffic up, with more diversion of First Class mail from surface to air carriers.

Highways — All-time high federal-aid program authorized, with $875 million for public highway construction in 1956 and 1957. More emphasis on interstate system. Federal gas tax stays at 2c per gallon level. Toll road movement booming. Both rural and city motor vehicle travel show gains of around 3 per cent over 1953.

Railroads — Carloadings, freight and passenger traffic all down, as well as revenues. Drop in expenses lagging, so net operating revenue is down about 30 per cent compared with last year. Operating ratio is over 80 per cent for first time since 1950. Hardest hit domestic transport group, dropping with decline in industrial production. Should pick up somewhat as heavy industry receives more orders.

Railroad Equipment — Sizeable drop in orders, with some companies going out of business. Railroad capital expenditures down 20 per cent for first half of year, and may drop to 30 per cent for year. Actually retired 8,000 more cars than installed first five months of 1954, and orders for both cars and locomotives at rock-bottom level. Government concerned over declining troop-carrying capacity of passenger cars.

Shipbuilding — American shipyards hard pressed for orders, while foreign yards have several years' backlog of work. Department of Commerce study points out need for construction of 60 ships a year. President Eisenhower asks Congress for $81 million for new merchant ship construction, including construction-subsidies for four new combination passenger and freight ships.

Trucks — Traffic down first quarter about 5 per cent, but expected to pick up for second quarter. Still second best year for industry. Reciprocity among states in taxing trucks big problem, especially in Ohio and New York. Also concerned with railroads' selective rate cutting and proposed "piggy-back" operations.

Ocean Shipping — Volume of freight being handled at post-World War II low. Many ships being laid up. Percentage of nation's foreign commerce being handled by American bottoms has dropped under 25 per cent, another post-war low. Passenger business good, with chance of new records this year.

Petroleum Pipe Lines — Both revenues and traffic rising to record levels. New pipe line construction continues, with around 9,000 miles scheduled for year. Emphasis for first time on construction of products lines, as compared to crude lines.

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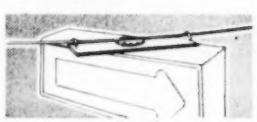

AHB-1 (patent applied for) is standard equipment on Perma-Lite signs. Multiple signs can be installed on one diagonal span wire, by simply adjusting the bracket. Sign is positioned by loosening, setting, tightening four bolts.

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SECTION NEWS

1954 - 55 WESTERN SECTION ITE OFFICERS
Left to right — Donald S. Berry, Immediate Past President; A. L. Hutchison, Vice-President; J. Al Head, President; C. C. Robinson, Secretary-Treasurer; J. E. Havenner, District Director.

Western Section

Principal among the accomplishments of the Annual Meeting held May 12th in Corvallis was the election of officers for the forthcoming year. Elected: J. Al Head, President; A. L. Hutchison, Vice-President, and Carlton C. Robinson, Secretary-Treasurer.

The business meeting with 43 members in attendance was a lively affair. The results are listed briefly below:

1: Approved three amendments to the Constitution and By-Laws for submission to the membership by letter ballot. The principal change proposed would be the extension of voting privileges to Junior Members. A considerable debate ensued as to whether Junior dues should be raised to $2.00 if this is done. The ballots on these measures will be distributed next month with the annual dues notices.

2. Authorized a sinking fund of $350 plus $100 each year to help defray expenses of the District Director in attending Board of Director meetings. The purpose of this fund would be to open the District Director position in the future to those who might be barred otherwise by financial limitations in attending the four meetings held annually.

3. Expressed the desire of the Section to be host for the 1957 National ITE meeting. A committee will be appointed by President Head to determine the city to be presented as the Western Section's choice.

4. Instructed District Director Havenner to discuss at the next Board meeting the desire of Western Section to act as the nominating body for Director from this District.

5. Discussed the need for a "Section Affiliate" grade of membership and instructed the President to appoint a committee to report at the next meeting. This is a matter that should be discussed at Area meetings.

6. Accepted the offer of Jim Reading on behalf of the San Diego Area to hold the 1955 Annual Section Meeting in that city, June 22nd to 24th. The ITE Board of Directors has been invited to hold their June meeting in conjunction with ours.

Technical Sessions

The technical sessions held in Withycombe Hall on the beautiful Oregon State Campus were an outstanding success. The total registration was 128 and the sessions' attendance of over 100 testifies to this fact. Dave Schoppert, in charge of the proceedings, has promised that the proceedings will be published without delay. Of the several fine sessions, one of the best was the "What's New" panel moderated by Don Berry. Al Hutchison and Gerry Cysewski gave examples of interconnected actuated signal installations; Al Pepper told of the "Teen-Age Traffic Safety Conference" in Denver; Russ Bates described method and progress in the Bay Area transit study, and other comments from speakers and from the floor made this the feature of the meeting.

Social Sessions

As always, the social sessions were particularly enjoyable. Both the H-Bar-H dinner and the banquet presided over by Bill Bowes were excellent. Certainly the Section should feel honored to have had a speaker of the prominence and excellence of Joe Mattson at its annual meeting.

One of the commercial representatives reported getting two orders during the meeting just by going around the hotel knocking on doors. He got both orders at the first place he tried: "Get out" and "Stay out."

Northern California Area

Co-chairman B. A. Switzer and Doug Carmody report that their April dinner meeting drew a gathering of 47. The speaker, Joseph Hunter, of the California Public Utilities Commission outlined commission policy on mass transportation. Principal points were the use of gas tax funds for transit facilities on freeways, the desirability of a single transit system within a metropolitan area and the operational advantages of fixed rail vehicles for mass transit as opposed to trolley or gas bus operation. Certainly these points must have evoked considerable discussion among those present.

Los Angeles

The ITTE will sponsor a week long course in Traffic Engineering in August according to Bob Glenn, extension representative. The course, to be held at the State Building in Los Angeles, August 23-27, will be conducted by Dan Gerlough, Don Berry and Norm Kennedy and will cover all of the basic phases of Traffic Engineering. In addition to lectures on topics such as Street Lighting, Traffic Studies, and Intersectional Control there will be laboratory sessions and individual consultation with prominent traffic engineers in attendance.

The Los Angeles area is also planning to hold a dinner meeting in conjunction with the short course.

Mountain Area

Jack Bruce and Al Pepper report that the Teen-Age Safety Conference held

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in Denver resulted in the formation of a Western Regional Teen-age Traffic Safety Association with a board of officers from the states of Colorado, Nebraska, and California. Al reported with great enthusiasm at the Corvallis meeting and promises to keep information coming on the worthy effort.

Hank Barnes attended the meetings with two teen-agers from Baltimore. Hank participated in a panel discussion by relating techniques with respect to gaining public support for a traffic engineering program.

Miscellaneous

1957 will see the opening of a 20 million dollar shopping center in Portland, Oregon. The center, located on a 65-acre tract within a mile of the CBD, will be unique in that it lies exactly on the population center of the city. The 1,200,000 square feet of rental space will accommodate 135 rentals units and will feature a parking ratio of 2:1 in three story parking areas. Already on the site is the 11-story Bonneville Power Administration building and future plans call for a hotel and medical-dental building.

The Oregon Highway Department is experimenting with a novel sign to denote bypassed motel, service station, and restaurant locations. The sign, in the shape of an automobile silhouette, bears the legent "Tourist Facilities — Miles" and will be posted in advance and at the points of access.

Larry Thompson has left the Oregon State Highway Department to take the position of Assistant Traffic Engineer in Phoenix under Chuck Haley.

Reported by
C. C. ROBINSON
Secretary-Treasurer

Texas Section

Interest in the Texas Section is at a high level as evidenced by the fact that all 27 ITE members residing in Texas are now in the fold. Ten Local Section Affiliates have been approved for membership in the Section, three of whom have applications for ITE membership pending.

The first regular meeting of the Section since its organization by the Board of Direction was held in Houston on May 22, and the HoustonITEs headed by Gene Maier did a swell job as hosts. Attendance at the meeting was indeed gratifying as there were about 60 persons, including guests, present. Numbered among the guests was W. E. (Skinny) DeYoung, the WesternITE

ANNUAL MEETING WESTERN SECTION ITE BANQUET
J. O. Mattson, President of Automotive Safety Foundation, speaker.

from Los Angeles. Skinny brought wife Pat along with him, and the Texas Section sincerely appreciated Skinny's having made the long drive from the west coast to be present at the first meeting.

"Traffic Control in the Vicinity of School Zones" was adopted by the Section as a Research Project. The research will be conducted by the various members in their respective jurisdictions along the lines of articles published on this subject in the March and April issues of TRAFFIC ENGINEERING. Any information of value gained through this research will be given to the Chairman of the ITE Committee on Traffic Controls in the Vicinity of School Zones, Department No. 3.

After spirited balloting, the name "TexITE" was selected from a list of some 10 names submitted by various members as the official name for the News Letter to be published by the Texas Section.

The Technical Session which followed the business meeting included a Discussion of the Texas Manual on Uniform Traffic Control Devices, by M. V. Greer, Supervising Traffic Engineer of the Texas Highway Department; a discussion of Houston's Modernized Variable Frequency Downtown Signal System, by Eugene Maier, Houston's Director of Traffic and Transportation; and an inspection of the Master Control Equipment for Houston's Downtown Signal System.

No meeting would be complete without proper attention being given to social functions. A cocktail party at the home of the George B. Jamisons and a dinner at the Ship Ahoy gave the wives an opportunity to tell the hus-

bands how the traffic problems should be solved.

It was a good meeting enjoyed by all, and we are now looking forward to the Annual Meeting to be held in Dallas during the month of January 1955.

Reported by
M. V. GREER
Secretary-Treasurer

Southern Section — Newsletter

During the early part of April, the three Institute of Traffic Engineers members voted 2 to 1 to have the state of Oklahoma belong to the Missouri Valley Section. We sure hate to lose these fellows, but know they will contribute to the activities of the Missouri Valley Section.

Ed Sosman (Jr. ITE) recently left his position with the AAA in New York. As part owner, he now participates in the management of radio station WBGE, 1340 kilocycles on your dial, Atlanta, Georgia. Traffic engineering should get a plug as often as time and circumstances will permit.

Herman Hoose (Mem., ITE), City Traffic Engineer of Charlotte, North Carolina, has now regained his voice. First hand report, he is really using it, too! Herman writes: The City of Charlotte in cooperation with the Bureau of Public Roads and the State Highway and Public Roads Commission has awarded contracts for a million and one-half dollar highway improvement plan within the City of Charlotte. This will involve three highway grade separations, two railroad grade separations, and one bridge.

The City of Wilmington, N. C., has just put into operation within the central business district a twenty intersection flexible progressive signal system.

Wortham Dibble (Mem., ITE) reports: Traffic-wise things have been relatively quiet in this section of the country. However, several items which might be of interest include:

1. The City of Charleston, South Carolina, is considering a full-time traffic engineer.
2. Columbia, South Carolina, is in the process of making a parking survey as a joint operation between the City Planning Commission and the City Traffic Committee to whom Wilbur Smith is consultant.
3. Asheville, North Carolina, recently had a traffic survey but don't know any of the details.

Wortham has been working around Sumter recently for relocation of U. S. Highway 15 and 15A through the city.

Henry Barnes (Mem., ITE), City Traffic Engineer, Baltimore, Maryland, spoke to the Kiwanis Club in Memphis, Tennessee. Invitations were sent to city officials, members of the Traffic Advisory Commission, directors of the Downtown Association and others interested in improving traffic conditions in Memphis.

W. F. Watkins (Mem., ITE), Director of the Traffic Engineering Department, Louisville, Kentucky, writes:

Mr. William Gfroerer, assistant traffic engineer, advises me that he has received notification that he has been selected as an affiliate of the Southern Section of the ITE. I think this item is news worthy.

Also, we are planning the installation of neon wait-walk lights in downtown Louisville some time this year to operate in such manner as to help eliminate conflict between pedestrians and automobiles and to improve the flow of traffic. We do not have in mind separate pedestrian intervals, rather we intend to stop the crossing of pedestrians so that stragglers are not caught in the street by the red light and to, perhaps, hold pedestrians so as to permit turning vehicles to clear before they attempt to cross.

Earl J. Reeder (Mem., ITE), the "Old Faithful" of our organization advises:

Frederick L. Bell (Associate Member,

Traffic Authorities and City Officials

The **Portable Traffic Signal that meets YOUR Standards**

SPECIFICATIONS

Height—9′ 2″ overall.
Two 8″ wheels with rubber cushion tires.
Completely automatic; also manual control.
Self-contained battery charger, 110-volt.
Heavy-duty 6-volt battery, which will operate signal 18 hours continuously.

Easy on the traffic officer.
Easily handled by one man.
Easily wheeled off the street when not in use.
Easily transported to distant emergency spots by trailer.
Of course it's a portable signal.
In every essential respect it is a regulation-size traffic signal.
"TRAFFIC SENTRY", the portable traffic signal built by Portable Traffic Signals, Inc. was designed, constructed, and is sold to meet the standards set forth in the *Manual on Uniform Traffic Control Devices for Streets and Highways.*

Write for all the facts:

PORTABLE TRAFFIC SIGNALS, INC.
Manufacturers of the "Traffic Sentry"
146 W. 21st St. • RIchmond 5451 • Los Angeles 7, Calif.

ITE) of Tallahassee is associated with our firm for the Off-Street Parking Survey which we are now conducting for the City of Miami. This will deal with the off-street parking requirements in all critical areas within the city.

I hear that Walter D. Gottschalk (Mem., ITE) has sold his retail floral store in Miami and is now taking a vacation in Michigan. I have not heard any announcement of his future plans.

Two Miami firms, Maurice H. Connell & Associates (Edmund Friedman, Member, ITE, Vice-President) and Rader Engineering Co. (Earl J. Reeder, Member, ITE, Partner) are engaged in designing two sections of the proposed Sunshine State Parkway. This will be a toll highway between Miami and Fort Pierce, Florida, carrying through traffic past the congested areas of the almost continuous urban development between Miami and West Palm Beach.

David F. Dabney (Assoc., ITE) reports:

We (Palmer & Baker) recently signed a contract with the City of Mobile, Alabama, for a comprehensive transportation study of the city. This study will cover all phases of the traffic problem, and includes taking complete O & Ds, both internal and external, parking surveys, with complete plans for facilities location as well as financing. The transit needs of the city will be studied and full investigation made of all hazardous street conditions; new routing plans will be made for one-way streets in the business district, and a master street plan recommended. Part of the survey will also deal with a limited access system, and the first road will be built in the near future. Progressing concurrently with the traffic study will be an ambitious street improvement program calling for paving some 150 miles of streets.

In order for us to do a good job on this survey, the services of David B. Martin, former Traffic Engineer of Savannah, Georgia, and Assistant Traffic Engineer of New Orleans, Louisiana, were engaged. Dave went to work for us on May 24, and is presently deep in the intricacies of selecting the sample for the Lynch-type internal survey.

William H. Mann (Mem., ITE), Traffic Engineer, Nashville, Tennessee, wrote a short note as follows: So sorry not to have a contribution for the newsletter. As you know, I am the only ITE'r in this neck of the woods and "I ain't been doing nothing exciting" at all.

Paul Ristroph (Mem., ITE) has changed jobs and now is the Director of Utilities Department, City of New Orleans, Louisiana. He was formerly the Traffic Engineer with the New Orleans Public Service, Inc. This new position is very interesting and rather unique in the municipal field. Most utilities are regulated by a state agency usually termed a Public Utilities Commission. In New Orleans the Utilities Department does the regulating. The supervision of the regulation of mass transit, electrical energy, gas, taxicabs, ferries and all franchises pertaining to use of the streets as well as certain matters pertaining to railroads and telephones, is handled by the agency. This office also handles street lighting for the City of New Orleans.

Fenton Jordan (Assoc., ITE), City Traffic Engineer for Norfolk, Virginia, submits two publicity releases which were also sent to "Municipal News," Norfolk, City Employees newspaper:

The Traffic Engineering Division of the Department of Public Works put

LONGER RANGE—TARGET VALUE
FOR YOUR HIGHWAY TRAFFIC SIGNS WITH
GROTELITE REFLEX REFLECTIVE SHEETING

Grotelite
REFLECTIVE SHEETING

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COMPLETE LINE OF EMBOSSED METAL TRAFFIC SIGNS, REFLECTORS AND STREET NAME PLATES

This highly reflective, smooth surface reflex reflective sheeting makes a smashing, attention-compelling sign with longer range target value and full range legibility. Easily read night or day. The smooth, durable, self-cleaning surface can be screened, sprayed or brushed. It is easy to apply and makes the best long life, economical signs and markers. Available in sheets and completed signs.

THE Grote MANUFACTURING CO., Inc.
GROTE SQUARE - BELLEVUE, KY.
(Established 1901)

East and West... North and South...

Night and day... friendly signs like these* say "Welcome Visitors"

*Suggested specifications: 8' x 24' sign, assembled from six 4' x 8' panels of .064 ga. aluminum, reflectorized over-all. Sign face. Wide-Angle Flat-Top Silver "Scotchlite" Sheeting screened with Transparent Colors. Reinforced backing: 1" x 4" open type wood framing. (Details on supporting structures supplied on request.)

Tourists appreciate beautiful full-color signs that are easy to read both day and night. For this reason highway officials in every part of the nation are turning to reflectorized entrance signs, route markers, traffic and warning signs made with "Scotchlite" Sheeting. These signs are impressive by day . . . bright, clear, and breathtaking at night when car headlights bring them to life in full color. Furthermore, they are rugged, durable, and practically self-cleaning. Write today for complete information.

Reg. U. S. Pat. Off.

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REFLECTIVE SHEETING

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ONE MAN OPERATION
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LIGHTWEIGHT TRAFFIC LINER!
The JAWCO Lightweight Traffic Liner, with 5 gallon capacity, combines ease of operation with low initial, maintenance and upkeep costs.
One inexperienced man can easily give you smooth, even, straight traffic and zoning lines with a JAWCO Lightweight Traffic Liner.
Inquire today! For further information, delivery date and price, write —
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white coveralls on the Street Painting Crew last month. The coveralls have "Division of Traffic Engineering" printed on the back. Several advantages were derived from the use of the coveralls. First, they are a safety factor in that the men who must work in the street can be more easily seen by motorists. Second, they make a much neater appearance, and in fact, an advertisement for the city. Third, it has boosted the morale of the members of the Paint Crew. It helps to make them a team.

During the first two weeks in May, Norfolk's Traffic Engineer was the host to three European engineers who were visiting the United States to study our ways of moving traffic. The visit was sponsored by the Foreign Operations Administration as a part of the Federal Government's program for the exchange of experience and information.

Ken Wilkinson (Mem., ITE), Assistant Traffic and Planning Engineer, Virginia Department of Highways, is rapidly recovering from an eye operation.

The Bureau of Traffic Engineering, City of Richmond, Va., and Marshall B. McReynolds (Jr., ITE), Vice-President of Traffic Engineering Supply Company, have jointly planned the installation of flashing yellow signals on the approaches to several school zones. Extensive tests will then be undertaken to determine the effects of such lights.

Captain Groth (Affil., ITE), Virginia State Police Safety Engineer, visited New Orleans over the weekend of June 4, 5, 6, 1954.

J. P. Mills (Mem., ITE), Traffic and Planning Engineer of Virginia Department of Highways foresees a mammoth signing program incident to radar control speed enforcement on Virginia Highways which becomes effective July 1, 1954. This program will involve installation of radar warning signs on all highways at state lines and at corporate limits of cities and towns over 3,500. Closely allied to the legal use of radar speed control is the department's efforts to establish realistic speed limits on all Virginia highways. Already, some 300 locations have been investigated with radar speed recordings, generally with the aim of establishing speeds in the vicinity of the 85th per centile level.

The Virginia Highway Department has obtained approval to create Traffic Engineer positions in four of the eight Highway Districts. It is anticipated that two of these positions will be filled by July 1, 1954.

W. H. Gordon, Associate Traffic Engineer of the Virginia Department of Highways met with Duval Lee (Jr., ITE), Traffic Engineer, City of Lynchburg, Virginia, on June 1, 1954, in Lynchburg. The meeting was occasioned by the installation of a one-way street plan in downtown Lynchburg. The plan had been carefully reviewed by city officials, traffic engineers of the Highway Department and other interested persons. The operation was smooth and the plan received good public acceptance.

Prior to the installation of the plan, Lee had stationed members of his office and of the Police Department at critical points on the periphery of the C.B.D. These investigators recorded the time at which the bulk of the afternoon rush passed these points. The procedure will be repeated several times during the 90-day trial period to determine if the C.B.D. is being cleared more rapidly and traffic is being more expeditiously tunnelled into outlying areas.

The Commonwealth of Virginia came in first in the Safety Award, sponsored by the National Safety Council, which covers engineering, enforcement and education. Individual awards will be announced later.

Reported by
JOHN T. HANNA
Secretary-Treasurer

Michigan Section

The May meeting of the ITE was held at the Hillcrest Country Club in Mt. Clemens on May 12. The day's activities commenced with an enjoyable afternoon of golf which was followed by an informal cocktail party. An excellent chicken dinner was served at 6:30 P.M. to the 48 members and guest which attended the meeting.

President Sam Levine opened the business meeting by asking for the reading of the March minutes along with a financial report by the Secretary-Treasurer. The next order of business was a report by the Nominating Committee for the roster of candidates appointed to be considered by the membership for officers in the Michigan Section. Harold G. Bauerle, Chairman of the Committee, presented the following nominations:

President—Sven Kansman
Vice-President—Edward Gervais
Secretary-Treasurer—Al Malo

(continued on page 386)

Positions Available

There is an opening for a Traffic and Parking Coordinator in the City of Syracuse, N. Y. (Pop. 220,000). The position is to be created as a result of a study made by the Bureau of Municipal Research which pointed to the lack of coordination among the eleven city agencies dealing with traffic and parking as the major weakness in traffic administration. The report recommended that a coordinator, accountable directly to the Mayor be appointed to study traffic problems, make recommendations to the Mayor and to coordinate all city traffic and parking policy. The position calls for a vigorous administrator. A salary has not been determined as yet, but the position will be comparable to that of a department head. This ranges from $8,000 to $10,000. Applicants are advised to forward an outline of training and experience to Mayor Donald H. Mead, City of Syracuse, N. Y.

CITY OF LOS ANGELES
CALIFORNIA

Examinations for the following positions in the City of Los Angeles will be given in the near future.

Senior Traffic Engineer — Salary $641 - 797—College degree plus 8 years experience.

Traffic Engineer—Salary $575-715—College degree plus 6 years experience.

Traffic Engineering Associate—Salary $489 - 608—College degree plus 3 years experience.

Traffic Engineering Assistant—Salary $417 - 516 — No minimum requirement.

For further information, apply:

Civil Service Department
City Hall, Room 5
Los Angeles 12, California

TRAFFIC ENGINEER

The City of Corpus Christi, Texas intends to create a Traffic Engineering Division of the Public Works Department. Traffic Engineer needed to head this Division. Starting salary $6,132 annually, progressive increases. Must be Registered Engineer State of Texas or hold registration in another state that has reciprocal agreement with Texas and had at least two years' experience in responsible position in Traffic Engineering work. Send reply to DRAHN JONES, Public Works Director, P. O. Box 1622, Corpus Christi, Texas.

MIRO-FLEX SIGNS SAVE LIVES

When you are emphasizing safety, your traffic control program calls for Miro-Flex signs. Split second legibility tells both the motorist and the pedestrian what dangers lie ahead. America's most complete sign line includes everything from street name assemblies and parking regulations to standard stop signs and railroad crossing warnings. They are plain embossed or are reflectorized by either glass or plastic buttons or by reflective sheeting or beaded background. All signs are made to meet standards of U. S. Public Roads Administration.

Write for Your Free Copy of the Miro-Flex Catalog, "Signs by Miro-Flex."

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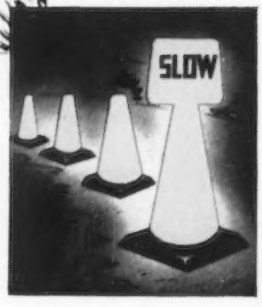
1824 EAST SECOND ST. WICHITA, KANSAS

SAFE-T-CONE®

ALL-RUBBER TRAFFIC GUIDES

For Fast-Efficient
TRAFFIC CONTROL



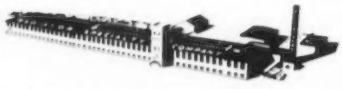
Safe-T-Cones are available with adaptor signs, with any lettering desired.

DAY-TIME OR NIGHT-TIME

Painted or reflectorized, Safe-T-Cones offer maximum visibility.

Wherever traffic control becomes difficult . . . during rush hours, street repair or emergency, these big, "steel-like" rubber traffic cones demand motorists respect. Available in two sizes, 18 inch and 28 inch, painted or reflectorized.

Write for complete information today!



RADIATOR SPECIALTY CO.
CHARLOTTE, NORTH CAROLINA

Patent Pending

2010

Letter to the Editor

Dear Sir:

The study of STOP sign observance conducted by Leo G. Wilkie, Traffic Engineer, Cook County Highway Department, which was briefly summarized in the April issue of TRAFFIC ENGINEERING, sets forth results that should be of grave concern to our profession.

It is important and urgent that we found out why 20% of the motorists are disregarding this all-important traffic control device. To what extent are design, color, location, and other factors responsible for this result?

One of these other factors may be the prolific use of four-way stops in the State of Illinois. When I was employed by the Illinois Division of Highways in the 30's, I expressed alarm at the rate at which four-way stops were being installed, pointing out that widespread use of such control might lead to widespread disregard of STOP signs by many drivers who would expect the "other fellow" to do the stopping. I certainly hope that my alarm was unfounded in that the results now experienced in Cook County can be attributed to factors which we can bring under control.

Mr. Wilkie is to be commended for undertaking this study and I hope that the additional analysis that is underway will point the way to overcoming this most serious problem.

T. T. WILEY
Commissioner
Department of Traffic
New York, New York

ON THE SHELF

Compiled by
Mrs. Kathryn Cassidy, Librarian
Mrs. Cele Kagan, Assistant Librarian
Yale Bureau of Highway Traffic

Davis, Harmer E.

Some Aspects of Metropolitan Area Transportation Problems. Institute of Transportation and Traffic Engineering, University of California, 1953. 15 pp.

A paper prepared for presentation at the Syracuse Transportation Conference, Syracuse University, April 29, 1953. The author has attempted to sketch some of the significant features in the development of transit and automotive transportation, and to indicate their complementary and competing aspects.

SECTION NEWS

(Continued from page 384)

Each of the offices were voted on in due order and since no other candidates were presented from the floor, the above-mentioned names were selected for the offices as designated.

Under old business, Mr. McMonagle asked whether an invitation had been extended to the ITE National Organization for the purpose of holding the 1956 meeting of the ITE in Detroit, Michigan. Mr. Malo, as chairman of the committee, responded in the affirmative and further stated that his committee would keep close contact on the progress in the matter. The membership was asked to consider the appointment of a publicity man who would furnish material to the national TRAFFIC ENGINEERING magazine in the near future.

At the conclusion of the business meeting a film entitled, "Move With the Green Light" was presented through the courtesy of General Motors.

Reported by
EDWARD F. GERVAIS
Secretary-Treasurer

Strictly Business

New Aluminum Signal Post

Two principal objectives of the New York City signal improvement program are the use of modern adjustable signals and the employment of WALK-DON'T WALK pedestrian indications. Over a year ago a critical evaluation was made of the existing cast iron tie rod post in the light of these two requirements. Extensive design changes were found to be necessary to provide for slip fitter spider mounting. The length of the post would also have to be increased to nine feet to provide for the side mounting of pedestrian signals with a seven foot minimum distance to the bottom of the pedestrian signal housing.

The old style signal post consists of a series of nesting castings. These castings are held together by two sets of tie rods, three rods in each set. Cast iron has a very low resistance to impact and the individual castings shatter under small energy loads. There is another and perhaps more important disadvantage of the old style post.

The tie rods have corroded to an astounding degree. Figure 1 is typical of posts which have been out in the street for a number of years. Under these conditions of severe rusting, the post breaks apart under any sharp blow such as a car backing into the post.

The old post is very heavy, weighing 232 pounds. In addition it is made of 42 parts, each part packed in a separate crate because of shipping requirements. When it was necessary to erect posts in the field, the parts had to be taken out of the different crates and assembled. The whole procedure was costly in terms of both shop and installation labor.

Because of the many disadvantages of the tie rod post it was decided to start from scratch and design an entirely new post. Three primary goals were decided upon. To reduce labor costs the new post would have to be constructed as a single unit requiring no assembly. The weight would be kept to a minimum and if possible be light enough so that it could easily be handled by one man without the use of hoisting equipment. For architectural reasons, the silhouette of the old post would be adhered to.

Considerable thought was given to this design problem and the use of aluminum was decided upon. With aluminum it is possible to have light weight combined with high strength. It can be inexpensively tapered in one operation without the use of a longitudinal weld. On the Dewey tapering machine the top four and a half inches could be made with a constant diameter for a good snug fit of the slip fitter. And with aluminum a low cost precision casting is possible by using a mass production permanent mold. Finally a number of tough aluminum alloys with high shock resistance are available.

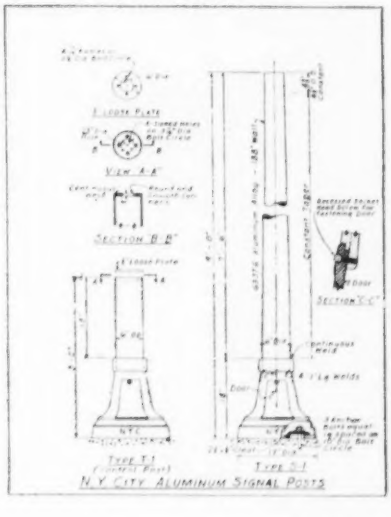
The conventional way to anchor the new post would be to weld angles to the inside vertical surface of the base casting. While perfectly suitable for new installations this method would not be practical for maintenance replacement of existing posts. In the past twenty years all anchor rods have been installed 120 degrees apart on a ten inch bolt circle. Sometimes the mechanics were not too careful in the exact placing of the anchor bolts. They knew that by bending the tie rods the post could be attached to any anchor bolt located within the foundation. A way had to be found to provide the same flexibility without the use of tie rods.

After much thought, a solution was found to this seemingly insoluble problem. As shown in the drawing there is an integrally cast lip on the bottom of the base casting. A galvanized steel anchor clip fits on the top of this lip and holds the post tightly against the foundation. In this manner the post can be securely anchored without dependence on the exact placement of the anchor rods.

The shaft is made of 3/16 inch 63 ST-6 alloy tubing. The base has a minimum thickness of 3/8 inch and is cast of No. 43 alloy. The door is fastened with a socket head stainless steel screw. The socket head seats in a dimple on the door so that only an Allen Key wrench can be used to open the door. This scheme eliminates vandalism by youngsters who in the past have used knives, screw drivers, and coins to loosen round head door screws.

The Department of Traffic has adopted a policy of mounting all controller cabinets on separate control pedestals. The conventional way would be to use a four and a half inch slip fitter attached to the controller cabinet. Since there is a six inch opening in the top of a base casting, the use of the slip fitter would have resulted in an extreme and unsightly taper on the short length of shaft. It was therefore decided to use an entirely new approach to the controller mounting problem using straight six inch tubing.

As shown in the drawing, a half inch plate with a 2½ inch opening is welded to the top of the post. Four 7/16 inch



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THE NEW Union Metal Folder, No. TR-100, clearly explains why Monotubes are first choice for overhead sign support use. With steel Monotubes, you benefit from superior strength, easy installation, attractive appearance, and greatly reduced maintenance.

These structures are designed on the basis of a maximum sign area of 100 square feet, and a weight of 500 lbs. They meet heavy loading district requirements of the National Electrical Safety Code.

In addition to photos, two pages describe standard Monotube Overhead Sign Supports, including assembly and installation details, dimensional data and unusual applications.

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Please send me your new Folder on Monotube Overhead Sign Supports.

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CITY_____ ZONE____ STATE_____

slots are cast in the plate and four 7/16 inch holes are drilled in the bottom of the controller housing. Using an additional loose plate as a giant washer, the cabinet is attached with four 3/8 inch stainless steel carriage bolts. The head of the bolt is inserted in the bottom of the welded plate and the square shank of the carriage bolt fits into the 7/16 inch groove so that the bolt cannot turn while the nut is being tightened inside the controller housing. This setup results in a universal mounting device which is inexpensive and vandal proof. With this arrangement any size controller housing can be attached to any design of control pedestal with a minimum of field labor time.

In some of the old foundations, conduit elbows are located so that it is necessary to remove a small segment of the lip to install a new post. The necessary alteration to the new post can be easily accomplished in the following manner. Two radial cuts are made in the lip with a hacksaw, then a line is chiseled on the bottom edge of the lip about half an inch from the outside edge. A few blows with a hammer suffices to produce a rectangular opening in the lip. The whole operation takes seven minutes.

In October of 1953 the Department of Traffic prepared a detailed set of plans and specifications for the new posts. Bids were submitted by the three principal manufacturers of aluminum lighting standards. The Contract was awarded to the low bidder, The Pfaff and Kendall Co. of Newark, N. J.

Following is a comparison of the old and new posts:

ITEM	OLD POST	NEW POST	DIFFERENCE
Height	8 feet	9 feet	Foot Higher
Weight	232 lbs.	60 lbs.	172 lbs.
Initial Cost	73.91	48.80	25.11
Erection Labor	14.86	10.13	4.73
Shop Labor	6.00	1.00	5.00
Total savings per post			34.84

As New York uses over 1300 posts per year, an annual savings in excess of $45,000 will be attained. Additional savings due to lower maintenance cost over the years is also anticipated.

MEMBERSHIP INFORMATION

may be obtained by writing to:

Executive Secretary
Institute of Traffic Engineers
Strathcona Hall
New Haven 11, Connecticut

Report of June Meeting Of Board of Direction

Eight of the 11 members of the Board of Direction answered affirmatively when President McNeil ordered the roll call for the second meeting of 1954 at 9:00 A.M., Thursday, June 17, at the Dearborn Inn in Dearborn, Michigan. Messrs. McNeil, Porter, Prisk, Crandall, Holmes, McMonagle, Sielski and Wetzel were present. The Agenda included a score of items and members introduced at least three additional subjects for discussion. It was necessary for the Board to be in session all day Thursday and four hours Friday morning. In spite of a full 10 hours of work it was not possible to clear the agenda completely, as several items were ordered carried over until the next meeting.

The Board was invited but because of the crowded schedule could not attend the annual summer outing of the Michigan Section Thursday afternoon at the Warren Valley Country Club. However, the Board members did join the Michigan Section for their dinner meeting in the clubhouse as the guests of the Michigan Automobile Club. About 100 Section members and guests were present.

The Technical Council also held its meeting at the Dearborn Inn on Wednesday, June 16, the day before the Board met. Messrs. Porter, Evans, Braff, Malo, Siegel and Sielski, Council members, and McNeil and Todd ex-officio, were present. Charlie Prisk visited the Council meeting part of the day.

The Michigan Section's arrangements made for the comfort and entertainment of the Board and Council members were simply wonderful. To begin with, arrangements had been made with the Ford Motor Company's Special Services Division to have cars and drivers available to each and every Board and Council member at all times. Each member was met at the airport or railroad station and driven to the Inn. The Ford Company furnished deluxe private car transportation to and from the Warren Valley Club meeting, to and from Friday's special luncheon in downtown Detroit (see below), back to the station or airport, as well as for the trips of several individuals to various places, including the new Northland Shopping Center and other points of interest in Detroit.

Dearborn Inn in itself was an unusual experience. A 100-room air conditioned hotel, it is designed, built, decorated and furnished in the Early American mode. Its public room (lobby) is spacious and beautiful.

Wednesday night, June 16, the Ford Motor Company was host to the Council, Board, 1953 Awards Judging Committee (which met that afternoon in Detroit) and local Section members at a delightful reception and dinner at the Dearborn Inn. On Friday the Detroit Traffic Commission arranged a reception and luncheon entertaining the Board, Council, and Judges Committee and many of the city's industrial, governmental, and commerce leaders in honor of Detroit having won the top award for Traffic Engineering achievement in 1953. President McNeil was privileged to congratulate the traffic officials for their accomplishment and to announce the other winners.

Important decisions or actions (not arranged in order) of the Board include:

1. Discussed the financing of additional activities such as a reactivation of the in-service training programs.

2. Decided to incorporate the Institute under the laws of Connecticut.

3. Accepted the donation of a desk, chair and lamp for the Executive Secretary's use which was paid for by the Buffalo Annual Meeting Arrangements Committee. The $240 cost of the furniture had been contributed by the Buffalo committee from their small surplus left after all of the last annnal meeting expenses were paid.

4. Directed that a review of the district boundaries be made with the view of equalizing the membership among the districts. Report will be made to next meeting.

5. Accepted with profound regret the resignation of Samuel G. Nowell, Jr., as Business Manager of TRAFFIC ENGINEERING magazine. Mr. Nowell is entering the U. S. Army under the provisions of the Selective Service Act. Agreed with Mr. Nowell's recommendation that his replacement should be a *traffic engineer* and authorized a committee of Messrs. Matson, Holmes, Wetzel and Todd to employ a suitable man at not over $5,500 per year.

(Possible Applicants please write to the Executive Secretary at once.)

6. Presented a 1954 Sustaining Organization certificate to Wald Industries, Inc., of Huntingdon, Pennsylvania, and extended invitations to become Sustaining Organizations to the Standard Sign & Signal Company of Dallas, Texas; the Streeter Amet Company of Chicago, Illinois; and the U. S. Porcelain Enamel Company of Los Angeles, Calif.

7. Approved the transfer of 8 Associates to Member and 15 Juniors to Associate. Elected to membership: 1 Member, 12 Associates and 14 Juniors. Extended invitation to 2 Affiliates.

8. Discussed the problem of locating a permanent national ITE headquarters. Decided to review the report of a 1950 committee on the strength of which the Board had authorized moving the headquarters to Washington, D. C., in 1951, provided that an additional surplus of $2,500 could be developed in the operating account. Appointed a committee of Mr. Holmes, chairman; Mr. Prisk and Mr. Sielski to formulate a formal proposal for consideration of the next Board meeting.

9. Adopted a policy on the reinstatement of delinquent members. Reinstated a former member.

10. As petitioned by Midwest Section resolution the Board agreed to publish in TRAFFIC ENGINEERING magazine the name, address and grade applied for of each applicant for membership or transfer. (See page 392).

11. Approved an amendment of the Southern Section's By-Laws increasing the Nominating Committee to at least 5 voting members.

12. Approved amendments of the Western Section's Constitution and By-Laws permitting a Junior member to be elected Secretary-Treasurer; a restatement of the Section's annual dues; and clarifying clauses outlining the duties and responsibilities of the Nominating Committee, Secretary-Treasurer, and members desiring to file petitions concerning the nomination of officers, etc.

13. Gave Professor C. H. Oglesby and Member Henry K. Evans copyright permission to reproduce Fig. 95 and Fig. 139 of the Traffic Engineering Handbook in their respective proposed publications.

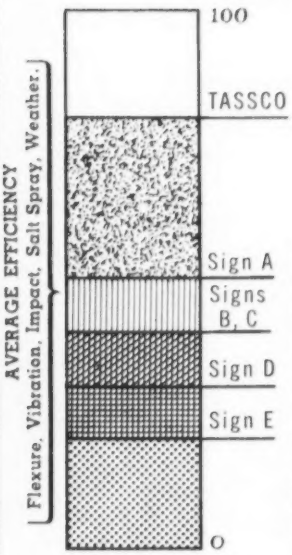
14. Approved the Technical Council's plans for the technical sessions at the forthcoming Kansas City meeting.

15. Received a well planned preliminary report from a Committee of Directors regarding the conduct of future annual meetings, and as a result adopted the following policies relative to future annual meetings:

a) The site of the annual meeting is to be rotated among the 6 districts.

b) No district to have 2 meetings within 6 years of each other un-

the TASSCO story



"... Gentlemen: Tests for determination of durabiblity characteristics of 6 sets of test panels (signs produced by six different manufacturers) are now complete. It was desired to determine effects when subjected to flexing, resistance to vibration, ability to withstand impact, resistance to salt spray and weathering." *

THE RESULTS REPORTED WERE ANALYZED AND REDUCED TO GRAPHIC FORM. **The bar graph tells the Tassco story!**

Here's proof that Tassco All-Aluminum signs provide more strength, more resistance to deterioration, and more legibility for longer than five other leading makes! Tassco Signs, highly competitive in first cost, are obviously your municipality's finest investment for traffic, highway, road and street use.

Traffic and Safety officials are invited to write for the new Tassco catalog, and to use the Tassco advisory services without obligation.

*Excerpt from letter of report on tests conducted under the auspices of one of the nation's largest municipalities, under impartial laboratory conditions using standard testing equipment. Report is on file and may be seen on request.

The Sign of TASSCO Traffic Safety

TRAFFIC and STREET SIGN COMPANY

84 FOUNDRY STREET • NEWARK 5, N. J.

less some other district voluntarily surrenders its turn. No district is to be required to accept assignment. Meetings located in districts 5 and 6 are not to occur within 3 years of each other. The district to which the meeting is allocated shall recommend the specific city.

c) A recommended budget of receipts and expenses for annual meetings was adopted. Total expense is to be limited to $10,000 of which $5,500 must be collected from the receipts of the social functions. The remaining $4,500 would be subsidization to be contributed. The committee recommended that the local committee be required to raise only $2,000 of this amount from local sources while the remaining $2,500 is to be provided from the Institute's operating funds.

d) Authorized the establishment of a special annual meeting revolving fund to begin with the year 1955 with an initial sum (to be determined by September Board) to be set aside for financial aid to the Pittsburgh annual meeting.

e) In view of the predominant sentiment of commercial manufacturers opposing formal exhibits at ITE annual meetings, the Board of Direction considers this feature to be undesirable and unnecessary as a means of financing annual meetings.

16. Directed the Executive Secretary to advise each Local Section following the annual meeting that all recommendations for directorship nominations must be in the hands of the Nominating Committee member representing the district by January 1 of each year.

17. Approved adoption of the 36 proposals of the Joint Committee on Uniform Traffic Control Devices for revision of the 1954 Manual but requested that more research be given to the shape of the yield sign (by this action the controversial red stop sign proposal is approved).

18. Received a report that enough copies of the Traffic Engineering Handbook have finally been sold to offset all publication expenses. Approximately 4,000 copies with an inventory value of $11,000 remain for sale.

19. Instructed the Executive Secretary to study the design of the ITE lapel pin with the view of reducing its size.

20. Tentatively selected the dates of October 24-27, 1955, for the Pittsburgh annual meeting.

21. Set the next meeting of the Board for 10:00 A.M., September 26, 1954, at the Muehlebach Hotel in Kansas City, Missouri.

22. Adoped the following resolution:

WHEREAS, the Board of Direction selected Detroit as the site of its quarterly meeting in June 1954, as a result of invitation by the Michigan Section, and

WHEREAS, every effort was made by Officers and members of the Michigan Section, its friends and affiliates, the Ford Motor Company, the Automobile Club of Michigan, the State Highway Department, Wayne County and the City of Detroit to make special arrangements for the comfort, convenience, and entertainment of Board members, now therefore

BE IT RESOLVED, that the Board extend its sincere expression of appreciation and thanks to these many friends through appropriate letters transmitting the sense of this resolution to the aforementioned hosts.

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Pennsylvania Turnpike

New Jersey Turnpike

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3. There is nothing to wear, chip or fade; Stimsonite has unequalled *durability*.

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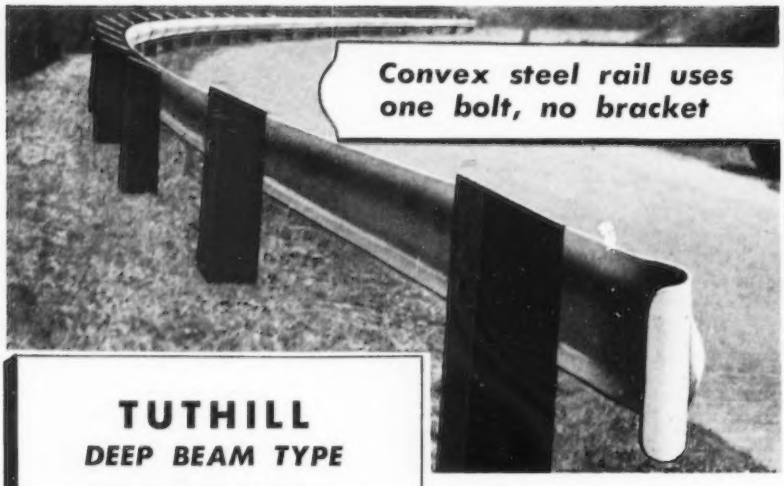

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Membership Applications

Last May the Midwest Section adopted a Resolution petitioning the ITE Board of Direction to publish the names of all applicants for membership or transfer, prior to final action on the application being taken. At its June meeting the Board agreed that the name, address, grade applied for, and date of each applicant would be published in this magazine as soon after the application is received as practicable.

The following listing includes all applications received up to July 1, 1954, which have not been acted on by the Board. Future issues will list only the applications received during the preceding month. The date listed is that on which the application was received in headquarters office.

APPLICATIONS FOR TRANSFER

ALVAREZ H, Luis E.
Casilla 207
La Serena, Chile
May 18, 1954 for ASSOCIATE grade

BIERMAN, Melvin
Traffic Engineer
Panama Canal Company
Balboa Heights, Canal Zone
April 29, 1954 for ASSOCIATE grade

BUTTERFIELD, Stephen E.
City Traffic Engineer
Philadelphia, Pa.
March 31, 1954 for full MEMBER

EXNICIOS, John F.
Assistant Traffic Engineer
Room 202 Howard Annex
537 St. Charles Avenue
New Orleans, La.
March 17, 1954 for ASSOCIATE grade

GARDNER, Lamar W.
Civil Engineer
609 Cotton Exchange Building
106 W. 3rd Street
Los Angeles 13, Calif.
March 9, 1954 for full MEMBER

GRANZOW, Edward F.
Traffic Analyst
Police Department
142 North Arroyo Parkway
Pasadena 18, Calif.
November 30, 1953 for ASSOCIATE grade

HANNA, John T.
3425 Cutshaw Avenue
Richmond, Va.
May 3, 1954 for full MEMBER

HANSON, Daniel J.
City Traffic Engineer
Room 306, City Hall
Peoria, Illinois
April 26, 1954 for ASSOCIATE grade

HARLESTON, Robert H., Jr.
Area Supervisor of Transportation
P. O. Box 455
Greenwood, South Carolina
December 12, 1953 for ASSOCIATE grade

HELLIWELL, Forrest H.
1916 Fernbank Avenue
Monterey Park, Calif.
December 7, 1953 for ASSOCIATE grade

HOWARD, Harry, Jr.
City Traffic Engineer
Jacksonville, Fla.
January 26, 1954 for full MEMBER

LEVINSON, Herbert S.
Associate Traffic Engineer
Wilbur Smith & Associates
265 Church Street
New Haven, Conn.
March 31, 1954 for ASSOCIATE grade

PASTOR, Ralph
333 Martense Street
Brooklyn 26, N. Y.
December 26, 1953 for ASSOCIATE grade

NEW APPLICATIONS

BARTELS, William J.
Senior Traffic Engineer
Bureau of Traffic Safety
15 Southard Street
Trenton 9, N. J.
May 10, 1954 for JUNIOR grade

DURHAM, Harold F.
Junior Civil Engineer
Room 268, Civic Center Building
San Diego 1, Calif.
June 14, 1954 for JUNIOR grade

GRAVES, Paul B.
2303 Cabrillo Avenue
Torrance, Calif.
May 1, 1954 for JUNIOR grade

HUNT, Thomas D.
815 East 110th Street
Seattle 55, Washington
March 22, 1954 for full MEMBER

IRELAND, Robert R.
Engineer of Traffic Services
State Highway Commission
Masonic Temple Building
Topeka, Kansas
May 24, 1954 for ASSOCIATE grade

KING, Gerhart F.
c/o Semrad
780 Riverside Drive
New York 32, N. Y.
March 7, 1954 for JUNIOR grade

MATTHEWS, Gerald
Chief Planning Engineer
525 West 13th South
Salt Lake City, Utah
March 1, 1954 for MEMBER grade

MOSS, Guido
Manager of Research & Schedules
St. Louis Public Service Co.
3869 Park Avenue
St. Louis 10, Mo.
February 23, 1954, for ASSOCIATE grade

O'CONNOR, David J.
4421 Adams Street
Chicago, Ill.
May 5, 1954 for JUNIOR grade

PENDER, Michael R.
148 Poplar Street
Garden City, N. Y.
June 17, 1954 for ASSOCIATE grade

REYNA P., Tomas E.
Correos del Este
P. O. Box 4361
Caracas, Venezuela
May 18, 1954 for ASSOCIATE grade

SPITZ, Salem
1807 12th Avenue
Los Angeles, Calif.
May 5, 1954 for ASSOCIATE grade

WADE, Philip E.
Assistant Traffic Engineer
Room 1422, Parliament Buildings
Toronto, Ont., Canada
May 19, 1954 for JUNIOR grade

WHITESIDE, Robert E.
2840 Greenway Avenue
Winston-Salem, North Carolina
May 14, 1954 for JUNIOR grade

ZRALEK, Robert L.
6906 N. Knox, Lincolnwood
Chicago, Ill.
April 14, 1954 for JUNIOR grade

Obituaries

Grant E. (Bob) Williams (Assoc. Mem., ITE) died suddenly May 3, 1954, after a very brief illness. Bob, as he was known to all of his friends, will be sorely missed by his fellow Midwest Section members. He gave unsparingly of his time and energy not only to the Section's problems but also to the Institute. At the time of his death he was Sales Representative for the Eagle Signal Company and owner of the Grant Williams Company, distributors of traffic equipment and highway supplies.

Born on April 25, 1895, in Chicago, Illinois, he attended public school and high school in that city. He was a veteran of World War I, having served overseas in France. He was married in 1921 and two years later became associated with Harrington-Seaberg of Moline, Illinois, predecessors of Eagle Signal Corporation.

In 1925, his employers started production of traffic signal equip-

(Continued on next page)

Wilbur H. Miller

We regret to report the tragic death of Wilbur H. (Bill) Miller (Assoc. Mem., ITE), Traffic Engineer of Fort Worth, on June 18, 1954. The *Fort Worth Star Telegram* reported the tragedy as follows:

TRAFFIC MAN'S LOVE OF TRAVEL COST LIFE

Wilbur H. (Bill) Miller's love of travel and the lure of a vacation cost him his life.

The 37-year-old city traffic engineer was killed Friday in a higway collision near Tucumcari, N. M.

His wife and two children, Suzanne, 5, and Warren, 3, were injured. Mrs. Miller suffered a back injury. Suzanne's injuries are undetermined. Warren suffered a broken leg.

The accident occurred nine miles east of Tucumcari on U. S. Highway 66 about 4:30 p.m. when the Miller's car and another vehicle collided head-on. Miller died en route to a hospital.

State Police said a car driven by Mrs. Odell Killebrew of Albuquerque, N. M., apparently veered across the center stripe and collided with the Miller vehicle. Mrs. Killebrew and her husband also were confined to the Tucumcari General Hospital for treatment.

EN ROUTE HOME

The Millers were en route to Fort Worth from a vacation trip in California.

Miller, native of Dupres, S. D., has lived in Fort Worth since 1949 when he came here as assistant city traffic engineer.

He was a graduate of the South Dakota School of Mines. During World War II he was a Seabee officer.

Prior to joining the traffic engineering staff here, he enrolled in Yale University's Bureau of Highway Traffic.

Miller was named acting engineer last August when T. R. Buckman resigned that post. In November he was named permanent traffic engineer.

Other survivors include three sisters, Mrs. Charles Boehrs of St. Paul, Minn., Don Sommer, Philip, S. D., and Loyd Hilsabebk, Normal, Ill.

* * * *

Miller first joined the Institute as a Junior Member January 8, 1951. Ironically, the Board of Direction completed action effecting his transfer to Associate Member the day before his death.

OBITUARIES

(Continued from page 392)

ment. The following year Bob sold the City of Chicago its Loop Control Board which is still in operation.

Bob's memberships included ITE, ISMA, American Legion, Rotary, Lake Shore Club, Masons, and the Medina Country Club. He is survived by his wife, Ella, and daughter, Barbara Jean.

ONLY THREE MORE MONTHS TILL...

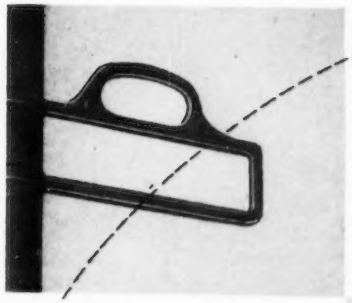
What? . . . The 25th Annual Meeting of . . .

Who? . . . The Institute of Traffic Engineers

Where- . . . Kansas City, Missouri from . . .

When? . . . September 27-30, because . . .

Why? . . . You are the ITE.



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Institute of Traffic Engineers New Members and Transfers

Elected by Board of Direction June 17, 1954

TRANSFERS

BALDWIN, David M.—Associate to Member
FOLEY, James L., Jr.—Associate to Member
FRAENKEL, Joseph A.—Associate to Member
FRANKLIN, Jerome D.—Associate to Member
GIBSON, James K.—Associate to Member
MERRIAM, Lucius A.—Associate to Member
SEXTON, Burton H.—Associate to Member
WALBERT, Thomas P.—Associate to Member
BRADFORD, Lewis P.—Junior to Associate
CULVER, Bruce R.—Junior to Associate
GALLAGHER, James A., Jr.—Junior to Associate
HALEY, Charles E.—Junior to Associate
HARDY, James H.—Junior to Associate
HEGGIE, Glen D.—Junior to Associate
LoJACONO, Ignatius J.—Junior to Associate
MILLER, Wilbur H.—Junior to Associate
MUSICK, Virgil J.—Junior to Associate
OLIVER, Richard H.—Junior to Associate
PETTERMAN, Jack L.—Junior to Associate
RANKIN, Woodrow W.—Junior to Associate
RICH, Marshall M.—Junior to Associate
TERRY, Deane S., Jr.—Junior to Associate
WALLEN, Martin A.—Junior to Associate

NEW MEMBERS

Member

LANHAM, Stanley M.
Vice-President & Director of Planning, Los Angeles Transit Lines, 1060 South Broadway, Los Angeles 15, Calif.

Associates

COLEMAN, Abner W.
Traffic Engineer, Vermont Dept. of Highways, Montpelier, Vt.

EVANS, H. W.
Traffic Engineer, Pennsylvania Dept. of Highways, Harrisburg, Pa.

GEISSLER, Felix D.
Assistant Chief Traffic Engineer, Gannett, Fleming, Corddry & Carpenter, Harrisburg, Pa.

GRAVENER, Donald F.
Junior Civil Engineer, N. Y. S. Dept. of Public Works, 65 Court Street, Buffalo, N. Y.

HAMMOND, Daniel S., IV
Traffic Engineer, Charles A. Maguire & Associates, Turks Head Bldg., Providence, R. I.

KEESE, Charles J.
Traffic Engineer, P. O. Box 831, Midland, Texas

LITCHFORD, James O.
Assistant Professor, North Carolina State College, Raleigh, North Carolina

LONG, Richard R.
Traffic Engineer, Traffic Engineering Div., Washington Dept. of Hwys., Olympia, Wash.

MICHAEL, Harold L.
Research Assistant, Joint Highway Research Project, Purdue Univ., Lafayette, Ind.

ROPER, Samuel E.
Traffic Designing Engineer, Texas Highway Dept., Austin, Texas.

WARD, Howard B., Jr.
Senior Engineer, Cloverdale & Colpitts, 120 Wall Street, New York, N. Y.

WRIGHT, Joe E.
Traffic Survey Manager, Texas Highway Dept., Austin, Texas.

Juniors

ARMSTRONG, William J.
Asst. Traffic Control Engineer, Kansas Hwy. Commission, Topeka, Kansas

BORTON, Weldon L.
Traffic Engineer II, Michigan State Hwy. Dept., Lansing, Mich.

BRAUNIG, Carl F., Jr.
District Assoc. Traffic Engineer, Texas Highway Dept., San Antonio, Texas.

BYRON, Gustav A., Jr.
Traffic Planning Supervisor, Traffic Service Section, Div. of Police, Miami, Fla.

CROSBY, John R.
Assistant Traffic Engineer, New Jersey Turnpike Authority, New Brunswick, N. J.

DRAKE, Gerard L.
Resident Officer in Charge of Construction, Aerojet General Corp., Sacramento, Calif.

GOELEN, Edmond M.
Traffic Engineer, 155 rue de la loi, Brussels, Belgium

GROSKLAUS, Robert C.
Asst. Dist. Traffic Engineer, Washington Dept. of Highways, 4200 Main Street, Vancouver, Wash.

HUBER, Matthew J.
Assistant Professor, Civil Engineering, Michigan State College, East Lansing, Mich.

HUMPHREY, Hilliard D.
Traffic Engineer II, Bureau of Street Traffic, Rm. 709, City Hall, Chicago, Ill.

JOHNSON, Paul R.
Traffic & Planning Engineer, Engineering Dept., Pueblo, Colo.

LOGAN, John I.
Asst. Dist. Traffic Engineer, Mass. Dept. Public Works, 11 Webster Street, Middleboro, Mass.

OSGOOD, Robert W.
Forester & Traffic Engineer, Oakland County Road Commission, 550 Telegraph Road, Pontiac, Mich.

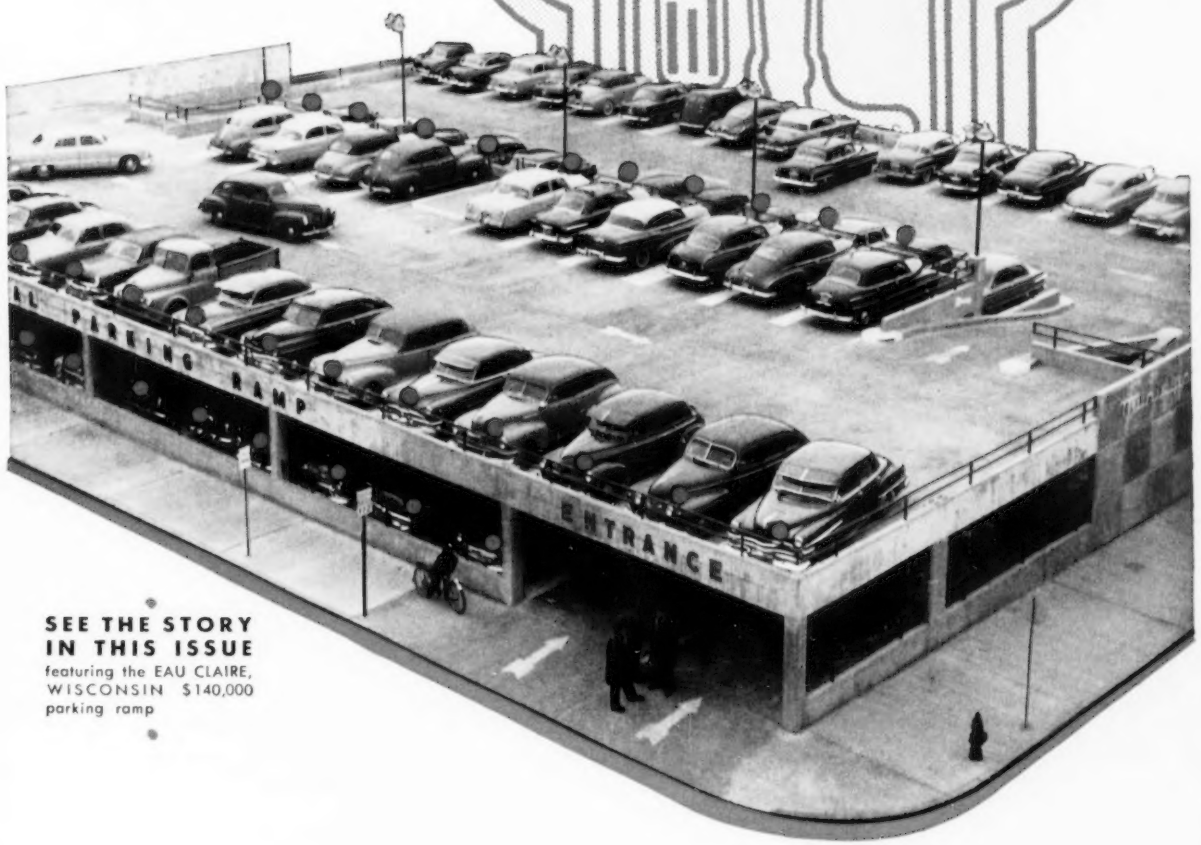
WILLIFORD, Robert E.
City Traffic Engineer & Planner, Municipal Bldg., Rocky Mount, North Carolina

Affiliates

CLARKE, Grant L.
District Manager, American Automobile Assoc., 512 South Andrews Avenue, Fort Lauderdale, Fla.

McCARTHY, Donald E.
506 East 43rd Terr. N., Kansas City, Mo.

BACK OF THE FINANCING . . .



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Manufacturers of the DUNCAN-AUTOMATON fully automatic and the DUNCAN-MILLER manual parking meters

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In 214 cities
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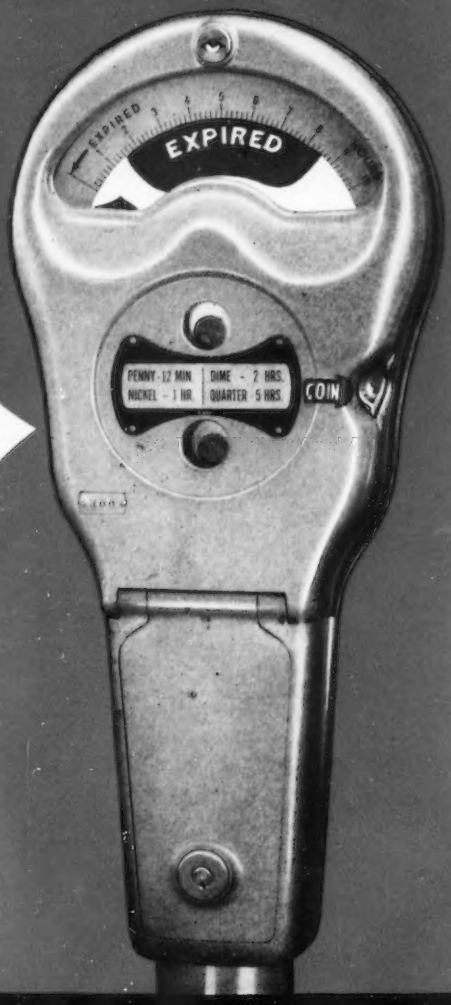

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MIRO-FLEX COMPANY 385
Associated Advertising Agency, Wichita, Kansas

MUNICIPAL STREET SIGN COMPANY 393
Martin Smith Company, New York, New York

PFAFF & KENDALL 377
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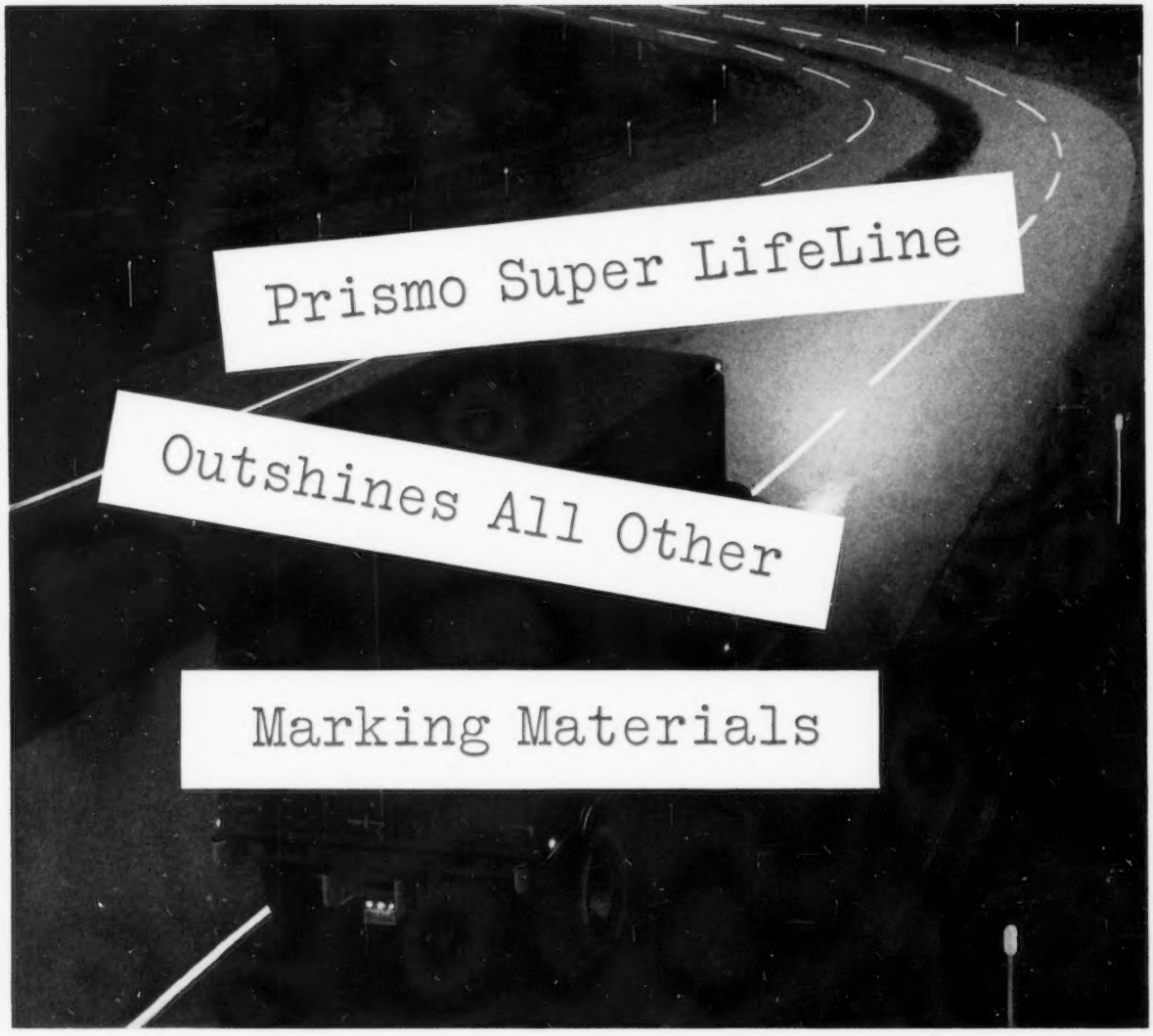

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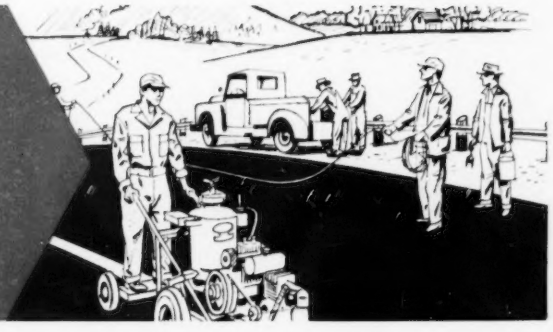
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